FORESTRY ABSTRACTS

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EDITORIAL NOTE.—The leader feature will be resumed in our next number, with Part I of an article on "Ambrosia beetles in forest and sawmill; their biology, economic importance and control."

ABSTRACT SECTION

0. FORESTS, FORESTRY, AND THE UTILIZATION OF FOREST PRODUCTS: GENERAL

0 (02). HANDBOOKS. MANUALS. TEXTBOOKS

See also No. 2337.

1857. BOUDY, P. Guide du forestier en Afrique du Nord. [**Handbook for the forester in North Africa.**] La Maison Rustique, Paris. 1952. pp. ix + 505. [F.] Price [£2. 12*s.* 6*d.*]

A textbook covering forest botany, silviculture, logging, utilization, soil conservation, and forest protection, with special reference to Algeria, Tunisia, and Morocco.

1858. SHIRLEY, H.L. **Forestry and its career opportunities.** McGraw-Hill Book Co., Inc., New York. 1952. pp. ix + 492. Many refs. Price 47*s.*

The purpose of this book is to present a broad picture of forestry in relation to its historic background . . . and is written to help beginning students. *From author's preface.*

0 (048.1). BIBLIOGRAPHICAL LISTS

See also Nos. 1972, 2055, 2953–5.

1859. Bibliographie des ausländischen forst- und holzwirtschaftlichen Schrifttums: Folge 5 enthält Titel des Jahres 1951/52. [**Bibliography of foreign literature on forestry and wood utilization: No. 5—titles of 1951–2.** *Mitt. Bundesanst. Forst- u. Holzw.* No. 28, 1952. pp. vi + 256. [G.] Price [£1. 7*s.* 0*d.*]

0 (052/054). PERIODICALS

See also No. 2578.

1860. ***La-Yaaran.*** Society of Israeli Foresters, P.O.B. 88, Nathanya, Israel. Price *Pruta* 350.

First published in 1950. From Vol. 2, No. 2, February 1952, contains English summaries. Citation in *For. Abstr.*: *La-Yaaran.*

1861. **Third cumulated index for Journal of Forestry: volumes 38 through 48, January 1940 through December 1950.** Society of American Foresters, Washington. 1952. pp. 64. Price $2·00.

1862. ***Silvicultura.*** Escuela Industrial de Silvicultura, Maldonado. Irregular. No price given.

This is the first forestry periodical to be published in Uruguay, and is the official organ of the School of Forestry. Vol. I, No. 1 contains 28 pp. Citation in *For. Abstr.*: *Silvicultura, Uruguay.*

1863. ***Rimba Indonesia.*** Persatuan Peminat-dan Ahli Kehutanan (Union of Foresters in Indonesia), Bogor. Monthly. Price *Rupiah* 90 per year.

Vol. 1, No. 1, August 1952 contains some 50 pages. Articles are to be in Indonesian with English summaries, in English with Indonesian summaries, or in Dutch with English or Indonesian summaries. Citation in *For. Abstr.*: *Rimba Indonesia.*

0 - - 011. TERMINOLOGY. NOMENCLATURE

See also Nos. 1970, 1973, 1982, 1984, 1988, 2038, 2436, 2737.

1864. **British Commonwealth Forest Terminology. Part 1: Silviculture, Protection, Mensuration and Management, together with allied subjects.** Empire Forestry Association, London. 1953. pp. 163. Price 21*s.*

0 - - 087. APPARATUS, INSTRUMENTS, MACHINERY: GENERAL

1865. **Equipment news.** *Unasylva* 6 (4), 1952 (181–3).

Descriptive notes, with photographs, of the following among others: power-saw/fire-pump combination (Weyerhaeuser Timber Co., Portland, Ore.); the Collet Motoplanter, a mechanized hole-borer for afforestation work, which can also be used as a 'motocultivator' by attaching various accessories (Les Fils d'Albert Collet, 41 Rue Cardinet, Paris 17e) [cf. *For. Abstr.* 13 (No. 283)]; the Motormule, a tracked, load-carrying logging tractor fitted with land-clearing equipment (Motormule, Hacker u. Co., Molln, Austria); the Timberhog Bantam chain-saw, weighing 27½ lb. (Reed-Prentice Corp., Worcester, Mass.); and an automatic saw-sharpener (Interwood, 326 Old Street, London, E.C.1).

1866. HERBIGNAT, A. Une première journée de la mécanisation des travaux forestiers. [**A demonstration of the mechanization of forestry operations.**] *Bull. Soc. for. Belg.* 60 (2), 1953 (81–103 + 18 photos). [F.]

Describes equipment demonstrated to the Royal Belgian Forestry Society in October 1952. The following are described and illustrated. (1) Climbing devices: the Baumvélo [cf. *For. Abstr.* 12 (No. 2885)], and an extra-light, extensible ladder of duralumin [cf. *For. Abstr.* 13 (No. 236)]. (2) The use of explosives for making drainage ditches and removing stumps [cf. *For. Abstr.* 14 (No. 389)]. (3) Uprooting and removal of trees and stumps by the use of the Tirfor hand-operated winch, manufactured by the Société d'Etudes et de Construction d'Appareils de Levage et de Traction, Luxembourg, Pulvermuhl; the Tirfor weighs only 18 kg., can be operated by one man and will move a weight of 1500 kg.; with 20 m. of steel cable it costs 3500 francs [Belgian]. (4) Cleaning of plantations, forest roads and fire-breaks with motor mowers (Allen, Scythette, and Farmers Boy). (5) The adaptation of the Bungartz cultivator for hole digging [cf. *For. Abstr.* 13 (No. 283)].

11. SITE FACTORS: CLIMATE, SITUATION, SOIL, HYDROLOGY (WATER AND SOIL CONSERVATION)

See also No. 1997.

1867. HARTMANN, F. Forstökologie. [**The science of forest site types on the basis of ecological factors.**] Verlag Georg Fromme & Co., Vienna. 1952. pp. ix + 461 + 1 folding tbl. Numerous refs. [G.] [Price £3. 18*s*. 6d.]

Forstökologie is defined by the author as the science of the mutual relationships and effects of the physical, chemical and biological factors participating in the shaping of the *production forest* and its site. [It is to be noted that a special sense is given to the word *Forst*, and that *Ökologie* means the study of *site* in relation to living organisms and communities rather than *vice versa*, and is *not* synonymous with 'ecology'. For convenience, however, these two words are here rendered as 'forest' and 'ecology' (or 'ecological', where appropriate).] The theoretical part of this science consists of the 'science of forest site types' (*forstliche Standortstypenlehre*), which the author distinguishes from 'forest site science' (*f. Standortslehre*) in the sense that the latter attempts a synthesis of detailed quantitative studies of individual site factors, whereas the former works in the opposite direction, starting with the general picture—the actual condition representing the resultant of the interplay of biotic and abiotic factors—and attempts to characterize, classify and interpret site types accordingly, using readily observable features of site and vegetation, supplemented by essentially simple, rapid methods of physical and chemical investigation, and is thus capable of yielding results of direct practical value to the forester at no great expense and within measurable time. The subject therefore consists of climatology, soil science and vegetation studies applied and unified in the particular way required by the considerations outlined above. An introductory section (pp. 1–32) deals with general notions such as these, stresses the need for treating any site type as a unit in a developmental sequence peculiar to the conditions of locality and history under which it was formed, and examines the question of the stability and permanence of forest soil types in order to refute the view that progressive loss of bases and acidification, even in humid regions, is a general and inevitable phenomenon.

Part 2—*The 'forest-ecological' site type*—is chiefly theoretical and forms the bulk of the work (pp. 33–304). It examines in detail the factors concerned, their implications and interrelations, and means of using them for the diagnosis of site types. Its sections, the first 3 of which conclude with interpretations of their subject matter from the practical point of view, cover: (*a*) The forest ecoclimatic type, with the major conclusion that most of the requisite knowledge under this head can be gained indirectly, and more readily, from characters of soil and vegetation. (*b*) The 'forest-ecological' soil type: A chapter is devoted to the classification and nomenclature of humus, urging the case for distinguishing humus 'types' (by mode of formation, e.g. zoogenous, eumycete, anaerobic) from 'forms' of humus (by phase of development and chemical characters, e.g. calcareous mull, alkali mull, dry peat). A further chapter covers soil-forming processes and soil types, arranged in a genetic system devised by the author, which pays great attention to the formation of the clay fraction and its transformations during soil development. The practical conclusions include an account of visible characters and simple tests yielding information on the movement of substances in the soil, and brief descriptions of 11 Austrian 'forest-ecological soil-condition types'. There are 74 photos, many in colour, illustrating kinds of humus (photomicrographs) and soil profiles. (*c*) The 'forest-ecological' vegetation type—a brief review of literature, concluding that, for the purposes envisaged, very fine distinctions between vegetation types are probably unnecessary, the chief interest lying in knowledge of (i) the effect of particular species upon site factors, and (ii) their value as site indicators. (*d*) Types of root system as indicators of e.g. soil texture, nutrient distribution, water movements and aeration, illustrated by photos of adult and seedling root systems and a diagrammatic summary of rooting types characteristic of different sites.

Part 3—*Procedure in 'forest-ecological' site analysis and assessment* (pp. 305–405) contains sections discussing aims and methods in general, site appraisal in the field, site mapping and quality assessment, followed by 2 detailed practical examples of Austrian site investigations conducted according to the principles laid down, in (*a*) humid montane to subalpine forest of the Beech to Spruce belts in Styria, and (*b*) lowland forests of the Oak/Hazel/Hornbeam region in Lower Austria (forest/steppe ecotone).

Part 4—*Forest soil rehabilitation with special reference to fertilizing* (pp. 406–58) deals first with the subject in general, from the point of view of 'forest ecology', and then considers the various fertilizers available, and quantities necessary, under the heads: basic silicate rock meal, commercial mineral fertilizers, lime, organic wastes (including brushwood), green manuring, 'forest fallow' and pioneer forest, and burning (the last two categories with and without temporary agricultural use of the land). A summary of practical conclusions is appended.

The author stresses that his work is not the final exposition of a system, but an essay, to be improved in detail by further work, though the framework is not likely to change appreciably.

111. *The Atmosphere. Meteorology. Climate and Microclimate*

111.0. Practical Meteorology

1868. GEIGER, R. Der Unterricht der Forststudierenden in Meteorologie im Lichte der Ausbildungskrise der Gegenwart. [**Instruction of forestry students in meteorology in the light of the present**

educational crisis.] *Forstwiss. Cbl.* 71 (11/12), 1952 (380–4). [G.]

Presents an outline of a suggested syllabus for students of forestry.

111.2. Radiation and Temperature

1869. GEIGER, R.; MAUERER, K.; HOFMANN, G.; BAUMGARTNER, A. Untersuchungen zum Wärme- und Wasserhaushalt junger Fichtenbestände. [**Investigations into the temperature and water régime of young Spruce stands.**] *Forstwiss. Cbl.* 71 (11/12), 1952 (322–49). Numerous refs. [G.]

A series of 3 articles plus an introduction, reporting on preliminary results of work done at the Meteorological Institute of the Forstliche Forschungsanstalt, Munich, and the Meteorological Institute of Munich University, in the study of stand microclimate. Part I—Der Versuchsbestand [The experimental stand], by K. Mauerer, describes the experimental area of young, pure, naturally regenerated Spruce, its topography, climate, soils and ground vegetation. In Part II—Ein Strahlungsbilanzmesser für forstmeteorologische Untersuchungen [An instrument for measuring the 'balance' of radiation in forest meteorology], by G. Hofmann, an account is given of an instrument designed at the Meteorological Institute to measure this 'balance', i.e. the difference between the gain in energy from solar radiation, and the loss in energy through radiation from the earth's surface. Part III—Die Strahlungsbilanz in einer Fichtendickung [Balance of radiation in a young Spruce stand], by A. Baumgartner, describes the actual experiments. Measurements were taken at heights of 10 m., 4·1 m., and 2·4 m. The results, presented in graphs and tables, are discussed.

111.7. Humidity, Evaporation, Precipitation

See also Nos. 1899–1900, 2250–1

1870. KREČMER, V. Rosa jako činitel meteorologický, půdní, fysiologický, ekologický a rosa v lesnictví. [**Dew as a meteorological, pedological, physiological, and ecological factor, and dew in forestry.**] *Lesn. Práce* 30 (4), 1951 (340–75). 85 refs. [Cz.]

A comprehensive study of the subject. Includes a chapter on 'meteorological' dew (i.e. condensation on the soil surface or on objects above it), and on 'soil' dew (condensation within the soil) [cf. *For. Abstr.* 12 (No. 923)] as well as on the significance of dew for plant life. The second part deals with the rôle and significance of dew in forestry, and is divided into the following headings: dew in forest tending (nurseries, stands, various fellings); soil dew; dew in forest protection; and dew and forest pathology. The bibliography and footnotes include some 30 Czech, 20 German, and 10 Russian references, plus references to American, French, Austrian, Swiss, Hungarian, Dutch, and Rumanian sources. The references cover a period of ca. 50 years.

111.8. Climatology. Climate and Microclimate

See also Nos. 1869, 1899–1901, 2062, 2121, 2529.

1871. KÖSTLER, J. N. Waldbestände im Klimagefälle Süddeutschlands. [**Forest stands in a [growing season/rainfall] gradient in southern Germany.**] *Forstwiss. Cbl.* 71 (11/12), 1952 (359–68). [G.]

Presents (1) data on precipitation and temperature in different climatic areas of southern Germany (Bavaria, Württemberg, Baden, Hessen-Starkenburg and Rheinhessen); (2) a diagram showing different climatic types in a gradient based on total annual rainfall and number of days per year having an average temperature of over 10° C. (i.e. good growing days), and quoting localities representative of each type; (3) a diagram based on (2), showing the optimum conditions for different types of forest; and (4) a list of 7 forest types, quoting representative areas, and giving data on altitude, soils, total annual precipitation, and number of 'good growing' days.

1872. MROCZKIEWICZ, L. Podział Polski na krainy i dzielnice przyrodniczo-leśne. [**Division of Poland into natural forest regions and districts.**] *Prace Inst. Bad. Leśn.* No. 80, 1952. pp. 120 + 2. 58 refs. [Pol.russ.e.]

Discusses previous work in this field done by various authors since 1926. Divides Poland into 8 regions, a region being defined as a large continuous area having fairly similar physiographic conditions in which a certain forest site type, characteristic of the area and possessing homogeneous economic features, attains maximum productivity. The natural forest district is a secondary unit with more differentiated physiographic and biotic features. Thirty-six such forest districts have been established and described by the author. The regions he suggests are: (1) North-West (Baltic) (Beech and mixed Beech); (2) North-East (Mazurian-Podlachian) (Spruce and mixed Spruce forest); (3) West Central ('Greater-Poland'—'Pomorze') (fresh mixed forest—Pine with Beech and Oak); (4) East Central (Mazovian-Podlachian) (fresh mixed forest—Pine and Oak without Spruce, Beech, or Fir); (5) South-West (Silesian) (fresh and moist mixed forest); (6) South-East (central plateaux) (mixed and deciduous forests); and (7) Extreme South-West (Sudeten) (lower montane deciduous, and upper montane coniferous forests); (8) Extreme South-East (Carpathian) (forest as 7). The publication is based on previous field investigations and studies by various authors.

1873. ZARĘBA, R. Początek wiosny w Polsce środkowej i wschodniej na podstawie obserwacji leśno-fenologicznych rozwoju liści leszczyny i brzozy gruczołkowatej z lat 1934–37. [**The beginning of spring in central and eastern Poland, based on forest-phenological observations of the leaf-flush of *Corylus avellana* and *Betula verrucosa* in 1934–7.**] *Sylwan* 96 (3), 1952 (361–71). 31 refs. [Pol.]

The appearance of the first leaves of *C. avellana* and *B. verrucosa* has been adopted as the characteristic feature of the 'second phenological season', i.e. the early spring. Over the period investigated, the first leaves appeared in different regions of present-day central-eastern Poland between 15 April and 15 May (later and earlier dates referring only to sporadic cases); this 30-days' span has been divided into five 6-day periods. In most of the

regions the leaves were found to appear during the 2nd period; next comes the 1st period, while the 3rd, 4th, and 5th relate to small areas. Maps showing these periods resemble the map of the Polish forest regions and districts. [Cf. preceding abstract.]

1874. TROCHAIN, J. Les territoires phytogéographiques de l'Afrique Noire Française d'après leur pluviométrie. **[The phytogeographical regions of French West Africa and French Equatorial Africa based on rainfall.]** *Recueil des Travaux de la Faculté des Sciences de l'Université de Montpellier* (*Série Botanique*) No. 5, 1952 (113–24). 7 refs. [F.]

Cf. *For. Abstr* 14 (No. 209).

114. *Soil. Soil Science*

See also No. 1867.

1875. HARTMANN, F. Der Waldboden: Humus-, Boden- und Wurzeltypen als Standortsanzeiger. **[The forest soil: humus, soil and root types as site indicators.]** Österreichisches Produktivitäts- Zentrum, Vienna. 1951. pp. 152. 5 refs. [G.]

A condensed, somewhat popularized exposition, for practical use, of the corresponding matter in a forthcoming work [now published: see *For. Abstr.* 14 (No. 1867)]. There are 84 photos and photomicrographs (32 in colour).

1876. KWINICHIDZE, M. Prace Zakładu Gleboznawstwa Uniwersytetu w Poznaniu w zakresie gleboznawstwa leśnego. **[Research work in forest pedology, conducted in the Pedology Department of the University of Poznan.]** *Sylwan* 96 (3), 1952 (314–32). [Pol.]

Contains summaries of the following investigations: Data for the identification of forest soils developing on ground-moraine formations (*M. Kwinichidze*); Site classification in the Balczewo forest range (*K. Golinski*); Soil and ground cover in the Balczewo forest range (*S. Rząsa*); Soils of Pine stands, with particular reference to the ground cover in the Warcino and Przytocko forest divisions (*L. Voelkel*); The microfauna in Pine forests (*S. Król*); Invertebrate fauna of soils and site conditions (*Z. Margowski*); Forest ground cover and soil formations in some forests of the Baltic region (*S. Kosmieja*); Soils in Pine stands in the Wierzchowo and Szczecinek forest divisions (*H. Frąckowiak*); Sandy soils under Pine stands in the Lędyczek forest division (*Z. Kaszuba*); Soil conditions in the Srodborowo range (*W. Mucha*); Site conditions in the Wilczkowo range (*K. Legomski*); Oak forests on soil of the Krotoszyn type (*A. Kowalkowski*); and Soil formations and plant community relations under Beech stands in the Warcino and Przytocko forest divisions (*S. Szymański*).

114.1. Soil Physics

See also No. 1870.

1877. MASHIMO, Y. **[Properties of soil moisture, especially the pF value.]** *J. Jap. For. Soc.* 34 (5), 1952 (141–4). 36 refs. [Jap.]

A review of literature, mainly American.

1878. QUASTEL, J. H. **'Krilium' and synthetic soil conditioners.** *Nature, Lond.* 171 (4340), 1953 (7–10). 15 refs.

Gives some account of the development and properties of soil conditioners with references to literature. [Cf. *For. Abstr.* 13 (No. 3565).]

114.2. Soil Chemistry

See also Nos. 1880, 1886–7, 1891, 2008–11, 2017, 2062, 2064, 2073, 2344, 2358.

1879. NAJMR, S. Metoda pro oxydimetrickoodměrné stanovení uhlíku ústrojné půdní hmoty veškeré. **[Oxidimetric-volumetric method of determining carbon in the total organic substance of the soil.]** *Sborn. čsl. Akad. zeměd.* 25 (3), 1952 (219–24). 15 refs. [Cz.cz.russ.] C.G.B.

To 0·25 g. of fine soil (particle size below 0·25 mm.) in a 100-c.c. volumetric flask are added: 0·1 g. Ag_2SO_4 and 25 c.c. 0·1 *N* $Ce(SO_4)_2$; after stirring, 25 c.c. of H_2SO_4 (sp. gr. 1·80) are added, and the mixture is heated to boiling point. The boiling lasts 20 min. first without, then with a reflux condenser, until $Ce_2(SO_4)_3$ begins to separate. After cooling, the flask contents are diluted with water to ca. 50 c.c. and again boiled for several minutes. After again cooling, water is added to just below the mark, and the contents stirred. After another cooling, water is added to the mark. Next day, the solution is clear; 25 c.c. of it is mixed with 10–15 c.c. of 0·025 *N* solution of Mohr's salt, 20 c.c. of 20% H_2SO_4 and 5 c.c. of 25% H_3PO_4, and titrated in the usual way with 0·025*N* Ce $(SO_4)_2$, using diphenylamine as indicator.

114.3. Soil Formation. The Soil Profile and its Development. Litter, Humus etc.

See also Nos. 1887, 2008–11, 2063–4.

1880. LUTWICK, L. E., COLDWELL, B. B., and DELONG, W. A. **Leachates from decomposing leaves. I. Some general characteristics.** *Sci. Agric.* 32 (11), 1952 (603–13 + 2 photos). 7 refs. O.R.E.

Leaves of Beech [*Fagus sylvatica*], Gray Birch [*Betula populifolia*], Sugar Maple [*Acer saccharum*] and Poplar [*Populus* sp.] were exposed in trays on the forest floor throughout the year, and leachates were collected and examined after each rainfall of sufficient magnitude to cause percolation. It was found that the leachates tended to become more acid as the time of exposure lengthened, except during the interval between growing seasons, when the trend may be reversed. The pH values were lower and the titratable acidities higher in leachates from Maple leaves collected from a calcareous till soil of approximately neutral reaction than in leachates from Beech, Birch and Poplar leaves collected from acid soil sites. The total solids and ash contents of leachates were highest in Maple, and its ash tended to be more alkaline. Total N content, always low, tended to be highest in the June and July collections, and amino acids were present. Alanine, glycine and valine (or norvaline) were tentatively identified as present in leachate collections made in early June from all 4 species

1881. GORHAM, E. **The development of the humus layer in some woodlands of the English Lake District.** *J. Ecol.* 41 (1), 1953 (123–52). 53 refs.

A study of soil properties in some woodland sites in the Lake District revealed two very different trends in both surface and profile development, on similar parent material. Under the prevailing high rainfall, topography appears to be the major factor determining whether a flushed brown earth with a mull humus layer and Ash/Sycamore/Oak/Hazel tree community will develop, or a leached podzolic brown earth with a mor humus layer and Oak, Birch, and Rowan as the characteristic trees. *From author's summary.*

1882. WITTICH, W. Der heutige Stand unseres Wissens vom Humus und neue Wege zur Lösung des Rohhumusproblems im Walde. **[The present state of our knowledge about humus, and new ways of solving the problem of raw humus in the forest.]** *SchrReihe forstl. Fak. Univ. Göttingen* No. 4, 1952. pp. 106. 67 refs. [G.g.]

Surveys the present state of knowledge and gives in detail the results of the author's investigation of the α-amino N and heterocyclic N of the humus of some important soil types. Also discusses the effect of several methods of incorporating raw humus in the soil together with liming and growing legumes for soil improvement.

114.4. Soil Classification. Soil Types

See also No. 2073.

1883. PELIŠEK, J. Půdní typy na fylitech v lesních oblastech západní Moravy. **[Soil types on phyllites in the forest areas of Western Moravia.]** *Lesn. Práce* 30 (3), 1951 (238–56). [Cz.cz.russ.e.]

The following soil types can be found in forest areas of the Bohemian-Moravian plateau on phyllite rock: soils with latent, poor, medium, or strong podzolization; brown or grey forest soils, and gleys. All these belong to the loam type with a varying content of lamellar phyllite gravel, and are in most cases well aerated. Soil moisture is usually sufficient. The soils belong to acid, medium-acid, or weakly acid types. Humification proceeds favourably. The soils contain sufficient Na, K, and P_2O_5 but Ca and Mg are deficient.

1884. WŁOCZEWSKI, T. Gleby Białowieskiego Parku Narodowego. **[Soils of the National Park of Białowieża.]** *Prace Inst. Bad. Leśn.* No. 83, 1952. pp. 40. 2 refs. [Pol.russ.e.]

1885. DUGELAY, A. La déforestation du Karst en Yougoslavie. **[The deforestation of the Karst in Jugoslavia.]** *Rev. for. franç.* 1952 (12), (827–32). [F.]

It is held that the development of karst is due largely to deforestation and over-grazing.

114.5. Soil Fertility. Soil Toxicity. Soil Depletion and Exhaustion

See also Nos. 1867, 1875, 1997, 2141, 2344.

1886. INGHAM, G. **Effect of materials absorbed from the atmosphere in maintaining soil fertility.** *Soil Sci.* 70 (3), 1950 (205–12). 8 refs.

Experiments are described which show how cellulosic and related materials such as are found in plant residues and humus can adsorb from the air N and other compounds, which are then carried into the soil by successive rains and serve, in the absence of erosion, to maintain fertility at a moderate level indefinitely. The leaves of trees, consisting largely of cellulose, act in the same way as cellulosic materials such as dried grass, jute, sisal and wood fibres; that is, they adsorb from the air NH_3, NO_3, CaO and P_2O_5 in the form of particles that are smaller than dust. Unlike atmospheric carbon, these particles are not generally taken directly into the plant but, being water-soluble, are washed off the leaves by rain and enter the plant by way of the surface feeding roots. An idea of the actual amount of plant nutrients gained in this way is given by the results of an experiment carried out on the sea-coast of Natal. Rain water was collected in a rain gauge standing in the open and, at the same time, in a jar that received the rain dripping from the leaves of a growing tree [species not stated]. Monthly determinations of the composition of the filtered rain water were made in each case separately, and the experiment was continued for 12 months, during which 49 in. of rain fell. Results were as follows, the mean composition of the rain dripping from leaves of the tree and falling in the open (figures in brackets) being given as parts per million of rain: NH_4-N 2·6 (0·86); NO_3-N 0·1 (0·1); CaO 30·7 (8·7); P_2O_5 2·0 (0·34). The total mineral matter received by the soil from tree drip, in lb./acre/year, would be NH_4-N 28·6, NO_3-N 1·1, CaO 338, and P_2O_5 22. [Cf. *For. Abstr.* 13 (No. 1976).]

1887. ASAHI, M. **[Edaphic study of Norway Spruce (*Picea excelsa* Link) plantations in the Tokyo University Forest, Hokkaido.]** *Bull. Tokyo Univ. For.* No. 41, 1951 (1–31 + 12 photos + 1 map). 30 refs. [Jap.e.]

Physical or chemical properties of soil profiles in sample plots were observed. From the results it appeared that the distribution of total organic matter and its nature, and the quality of exchangeable Ca present, have an important effect on the soil profile and stand fertility. The distribution of organic matter in the upper layer, amounts of exchangeable Ca or the degree of Ca saturation and moisture content had a particularly marked effect on the growth of Spruce. *From author's summary.*

1888. ARNBORG, T. **The north Swedish forest site classification.** Forest Research Division, Forestry Branch, Ottawa. 1950. pp. 18.

Transl. of *Det nordsvenska Skogstypsschemat*, Svenska Skogsvårdsföreningens Förlag, Stockholm 1945. [Cf. *For. Abstr.* 8 (No. 140).]

1889. HEIKURAINEN, L. Suotyyppikysymyksen tarkastelua. **[Wet peatland types.]** *Metsät. Aikak.* 1953 (1), (17. . . 20). 5 refs. [Fi.e.]

Discusses the need to simplify Cajander's classification of wet peatland types, and some recent suggestions. *From author's summary.*

1890. BUNUŠEVAC, T. Ekologija nekih pretstavnika prizemne flore šumskih asocijacija Srbije. **[Ecology of some representatives of the ground flora of Serbian forest associations.]** *Glasn. šum. Fak., Beograd* No. 5, 1952 (105–48). 20 refs. [Serb.serb.f.]

The most favourable forest communities and soil conditions are described for *Mercurialis perennis*, *Asperula odorata*, *Veronica officinalis*, and *Pulmonaria officinalis*.

1891. COULTER, J. K. **'Gelam' soils: a study of their sulphur content.** *Malay. agric. J.* 35 (1), 1952 (22–35). 14 refs. O.R.E.

The S content of soils supporting 'Gelam' (*Melaleuca leucadendron*) was investigated in an attempt to find reasons for the reputed toxicity of 'Gelam' soils to crops. The results show that certain 'Gelam' soils contain as much as 6% S at a depth of 18 in., while others contain scarcely any. While the results are not conclusive, the presence of S is definitely a factor to be considered when opening up 'Gelam' areas.

114.6. Soil Biology

See also Nos. 2017, 2169.

1892. WAKSMAN, S. A. **Soil microbiology.** John Wiley & Sons, Inc., New York, and Chapman & Hall Ltd., London. 1952. pp. vii + 356. Many refs. Price 48*s*.

A textbook, designed to give a broad outline of the subject.

1893. IWAMURA, M. **[Biological studies on forest litter. (4) A tentative plan of litter fauna analysis.]** *J. Jap. For. Soc.* 34 (1), 1952 (9–11). [Jap.e.]

[Cf. *For. Abstr.* 13 (No. 2740).] Analyses were made on litter collected by two methods: (1) by free collection of about 100 g. litter, and (2) by placing about 30 g. litter in each of 3 containers of netting (mesh $\frac{1}{2}$ cm., $\frac{1}{10}$ cm., and $\frac{1}{15}$ cm. respectively), and leaving them in the same area for a whole year. Analysis of the catch, given in tables with English legends, shows that both methods can be used, although some improvement is needed. Method (1) is the more convenient.

1894. OKINAGA, T. **[Microbiological studies of forest soils. (I) The soil microflora of a forest of *Cryptomeria japonica*.]** *J. Jap. For. Soc.* 34 (5), 1952 (156–60). 26 refs. [Jap.e.]

A study of the soil microflora in a plantation of *C. japonica* in N. Honshu. Results are shown in a graph and in tables with English legends.

1895. OKINAGA, T. **[Microbiological studies of forest soils. (II) The soil microflora of *Thujopsis hondai* forest.]** *J. Jap. For. Soc.* 34 (7), 1952 (227–32). 17 refs. [E.e.jap.]

A detailed study in pure natural forests, well stocked and uniform.

1896. RONDE, G. Vorkommen, Häufigkeit und Arten von Regenwürmern in verschiedenen Waldböden und unter verschiedenen Bestockungen: 2. Untersuchungen in einem Forstbetrieb des Württ. Alpenvorlandes. **[Occurrence, population densities and species of worms in different forest soils under different cover types: 2. Investigations in a forest enterprise of the Württemberg foothills.]** *Forstwiss. Cbl.* 72 (1/2), 1953 (37–56). 9 refs. [G.g.]

[Cf. *For. Abstr.* 13 (No. 1822).] Populations were studied on (1) sites where measures had been taken for soil improvement, (2) sites where no such measures had been taken. In general, sites unfavourable to trees were also unfavourable to worms. The profound disturbance of the biocoenotic equilibrium which human interference can cause, was demonstrated by the fact that in moist *Myrtillus-Sphagnum*-type sites, populations on sites fertilized with farmyard manure had a worm population thrice that of the best untreated sites.

114.7. Soil Surveys and Surveying

1897. **Soil survey manual.** *Agric. Handb. U.S. Dep. Agric.* No. 18, 1951. pp. vii + 503. 42 refs.

A revision and enlargement of the Soil Survey Manual first issued in 1937.

116. *Hydrology. Soil and Water Conservation and Erosion*

See also Nos. 2206–7, 2250–1, 2503, 2948–50.

1898. KIRWALD, E. Forstlicher Wasserhaushalt und Forstschutz gegen Wasserschäden (einschliesslich Wildbachverbauung). **[Forest hydrology and forest protection against water damage (including torrent training).]** Eugen Ulmer, Ludwigsburg. 1950. pp. 160. 140 refs. [G.]

A manual containing sections on: the fundamentals of the water cycle and its place in forestry; damage to soil and crops (especially forest crops) by water or the lack of it (rain, floods, waterlogged ground and drought) and measures for control; the basis of forest hydrology and its practical use; prevention of and protection against avalanches; and prevention of damage resulting from overfelling. [Cf. *For. Abstr.* 11 (No. 45).]

1899. CEBALLOS, L., and ORTUÑO, F. El bosque y el agua en Canarias. **[Forests and moisture in the Canary Islands.]** *Montes, Madrid* 8 (48), 1952 (418–23). [Span.]

Local differences in climate in the islands depend largely on variations in altitude and exposure to the prevailing rain-laden northerly winds. Data from meteorological stations at various altitudes in the north of Teneriffe show that the zone of maximum precipitation is between 600 and 2000 m. A year's monthly readings for a standard rain-gauge in the open and another under a Eucalypt canopy at ca. 966 m. altitude, however, showed that condensation in the canopy more than trebled the amount of rain falling in the open. This fact accounts for the apparent lack of correspondence between climatic conditions and forest types in the Canaries.

1900. BYERS, H. R. **Coast Redwoods and fog drip.** *Ecology* 34 (1), 1953 (192–3). 12 refs.

Controverts the commonly held thesis that fog drip is an important means of supplying moisture to *Sequoia sempervirens* in the almost rainless summer of California. The effect of the so-called fog belt (really a stratus cloud layer) is to be found not in fog drip, but in factors associated with transpiration—(1) reduction of hours of sunshine, and (2) reduction of day-time temperature.

1901. GORDIENKO, M. Der Einfluss des Waldes bzw. der Waldschutzstreifen auf die Wasserverhältnisse und den Grundwasserstand im Boden.

[The influence of forests and shelterbelts on soil water régime and the water-table.] *Dtsch. Landwirtsch.* 4 (1), 1953 (43–6). 10 refs. [G.]

Reviews previous Soviet findings on the subject and (1) presents the results of recent investigations in the Kamennaya steppe into the influence of shelterbelts on wind velocity, snow depth, freezing of the soil, and its water content, (2) gives data from the Krasnokutsk Experiment Station (Rostov district) on the influence of young forests on the water-table, (3) examines causes of the increased water content of soils under forest cover, and (4) discusses the possible application of the findings to German conditions.

1902. MAŘAN, B., and LHOTA, O. Význam druhové skladby lesních porostů a hospodářských zasahu pro zasakování vody do půdy. **[The significance of forest stand composition and silvicultural treatment for the infiltration of water into the soil.]** *Sborn. čsl. Akad. zeměd.* 25 (6), 1952 (555–70). 15 refs. [Cz.cz.russ.g.] C.G.B.

A preliminary report, giving partial results from studies in various regions of Czechoslovakia, under 4 heads—of which (1) gives figures for infiltration to show the great increase after cultivation for agricultural crops, while the remainder deal with factors affecting infiltration under forest conditions, viz.: (2) *Composition:* Infiltration rates at depths of 0–2, 0–5, 5–10 and 10–20 cm. in the soil under Scots Pine with some Oak, an underwood of mixed deciduous species, and mull humus, were respectively 6, 5, 2 and 1½ times those under pure Pine with a thick raw-humus layer over podzolized sand. The slower filtration rates in the lower soil horizons of the mixed stand are attributed to absorption by the incorporated mull humus, with its great capillary pore space when swollen by moisture. Further measurements showed infiltration in all horizons down to 10 cm. depth to be 3 times as rapid under pure Beech as under pure Norway Spruce, and after saturation of the humus with water the difference in favour of Beech was even greater. (3) *Age:* Under dense Beech regeneration in the thicket stage, rates for the 0–10 cm. soil layer were little more than ½ of those in old, closed Beech; this decrease is ascribed to the temporary fall in humus content due to decomposition during the regeneration period. Rates for the same layer under young Spruce of the same stage were little more than ¼ of those under old Spruce. Differences between young and old stands of the same species were, however, much less than those between different species. (4) *Density and method of regeneration:* Comparison of old Beech (*a*) of full density, (*b*) of density 0·3 with abundant advance growth, and (*c*) of density 0·3 but opened too quickly and so having a ground cover of grasses instead of advance growth, showed that for the 0–2 cm. soil layer the rates in (*b*) and (*c*) were respectively ca. ½ and $\frac{1}{10}$ of those in (*a*). For the 0–5 cm. layer [not given for (*c*)], rates in (*b*) almost equalled those of (*a*). The figures emphasize the need for cautious opening of the canopy until regeneration is assured. Finally, the disadvantage of clear felling is illustrated by figures for a grass-grown clearing which showed rates for the 0–2 and 0–5 cm. layers of $\frac{1}{19}$ and $\frac{1}{15}$ as compared with the old, closed Beech forest.

1903. WENDOVER, R. F. **Observations on the effect on stream-flow of transpiration from the forest cover.** *Philipp. J. For.* 7 (1/4), 1950 (1952), (89–94).

Water from a pipe-line supplying homesteads in Mindanao, from the catchment of a small stream on the S.W. slope of a mountain, gradually diminished from January, when the monsoon wind began, and from February failed for several hours during the afternoon, running again in the evening. Measurements showed that evaporation in the settling basin was not responsible, and it is concluded that the water was lost by transpiration from the forest in the catchment area. The mechanism of transpiration and the relation of transpiration to the soil's water-holding capacity, to run-off and to erosion, are discussed.

1904. OGIHARA, S. **[Integral method of representing the stream-flow controlling function of a catchment and its application.]** *Bulletin of the Tokyo University Forests* No. 39, 1951 (123–34 + 1 gph.). 1 ref. [E.jap.]

Assuming that the run-off-controlling function of a catchment area is defined by its capacity for equalizing the amount of water discharge, the author applies Sakurai's method of calculating the deviations in the stream-flow (*Bulletin of the Tokyo University Forests* No. 25, 1937) to data obtained in the stream-gauging experiment conducted in 4 experimental catchment areas in the Tokyo University Forest (Aichi prefecture). The advantages of the 'integral method' of evaluating the deviations in flow intensities compared with the 'step method' are stressed, the former making use of even the minutest changes in the stream-flow. The coefficient of variation (c.o.v.) by the integral method is always greater than that by the step method. Low values of the c.o.v. were obtained for the catchment area with the best forest conditions, while the highest c.o.v. was observed in that with poorest forest conditions; these two areas do not differ appreciably in topography. The final section of the paper deals with a new apparatus of the author's design for transforming the water-level/time curve into a (water-level) *n*/time curve, used in the integral method referred to above.

1905. NOGUCHI, Y. **[A study on the run-off-controlling effect of forest by the statistical method.]** *Bulletin of the Tokyo University Forests* No. 39, 1951 (135–41). [Jap.e.]

Comparison of 3 statistical formulae applied to data obtained from experiments on 4 catchment areas [see preceding abstract] shows that the most suitable is the formula

$$F_1 = \sqrt{\frac{\Sigma d^2}{n}} \Big/ S_p A_r$$

where d is the difference between the daily run-off and the average for a year, n is the number of days in a year, S_p is the standard deviation of the daily precipitation, and A_r is the average daily run-off.

1906. OGIHARA, S. **[Erosion control in Japan.]** *Misc. Inform. Tokyo Univ. For.* No. 9, 1952 (31–63 + 3 photos). [E.jap.]

Discusses the history of erosion control in Japan, the extent of erosion by water and wind and their control, and sand-dune fixation.

14. SYSTEMATIC ZOOLOGY

145.7. Insecta. Entomology

See also Nos. 2430 *et seq.*, 2825 *et seq.*

1907. ***Distribution Maps of Insect Pests. Series A.*** Commonwealth Institute of Entomology, 41 Queen's Gate, London, S.W.7. 12 maps p.a. Price 6*s.* p.a.

A new series of maps, the first issued June 1951, showing world distribution of insect pests. On the reverse side of the map is a list of the countries in which the insect is found, giving references to literature abstracted in the *Review of Applied Entomology, Series A* (*Agriculture*), or to lists filed by the Commonwealth Institute of Entomology. Abbreviation in *For. Abstr.: Distr. Maps Insect Pests* (*Ser. A*).

Nos. 3, 4, 7, 21, 22 and 24 deal respectively with *Chrysomphalus dictyospermi, C. ficus, Quadraspidiotus perniciosus, Distantiella theobroma, Sahlbergella singularis* and *Saissetia oleae.*

1908. LESTON, D. **A genus and species of Miridae (Hemiptera) new to Britain, with a key and check-list of the British Deraeocorinae Douglas and Scott.** *Ent. mon. Mag.* 88 (1063), 1952 (273–6). Numerous refs.

Alloeotomus gothicus, hitherto not reported in Britain, has been collected from Pine in Surrey and seems to have become established in Britain.

1909. NEUMARK, S. ***Chrysopa carnea* St. and its enemies in Israel.** *Ilanoth* No. 1, 1952. pp. 127 + 13 + 68 drawings and dgms. 24 refs. [E.e.heb.]

A full account of the life history, parasites, and predators in Israel of this lacewing, which is the most important predator of a *Matsucoccus* infesting young Pine stands in that country.

1910. ANGUS, T. A. **The aerobic bacteria associated with the eastern Hemlock looper *Lambdina fiscellaria* (Gn.).** *Canad. J. Zool.* 30 (4) 1952 (208–12). 9 refs. P.R.

A study was made of healthy Hemlock loopers (*Lambdina fiscellaria* Gn.) to determine whether a specific bacterial flora is associated with this insect. Larvae, pupae, adults, and eggs were examined by a number of methods and the bacteria found were cultured and classified. Organisms belonging to 9 genera of bacteria were isolated and they were principally of foliage-contaminating or soil types that could be ingested with the insects' food. Few of the ingested bacteria survive the digestive process. It is concluded that the bacterial flora is adventitious. *Author's summary.*

1911. TOMIĆ, D. Prilog poznavanju uticaja povišenih temperatura i potapanja u vodu na jajne gusenice gubara (*Liparis dispar*). **[Effect of high temperatures and immersion in water on the fertile eggs of *Lymantria dispar*.]** *Glasn. šum. Fak., Beograd* No. 5, 1952 (221–42). 7 refs. [Serb.serb.f.]

Presents results of laboratory investigations (1950–51) on the effect of temperature and immersion in water on the viability of eggs of *L. dispar.* Optimum conditions for the hatching of larvae are: temperature 20–25° C., relative humidity 80%. A higher temperature with the same humidity increases egg mortality. The longer the eggs are exposed to temperatures of 30° and more, the greater their mortality. It seems that the mortality is affected by the age of the eggs tested, younger eggs being more resistant. When immersed in water, egg mortality steadily rises, becoming 100% after 15 days. Fertile eggs were found to be more sensitive to immersion as their age increases. No adverse effect of immersion on the hatching of *Anastatus disparis* larvae was observed.

1912. BLETCHLEY, J. D. **A note on the prepupal stage and the external sex characters of the pupae of *Anobium punctatum* (Deg.) (Coleoptera, Anobiidae).** *Bull. ent. Res.* 43 (4), 1953 (587–90). 7 refs.

1913. SCHEDL, K. E. Bestimmungstabellen der paläarktischen Borkenkäfer. Teil IV: Die Gattung *Ips* De Geer. **[Keys for the determination of the Palaearctic barkbeetles. IV: The genus *Ips*.]** *Mitt. forstl. VersAnst., Mariabrunn* No. 46, 1950 (67–88). Many refs. [G.g.]

Key to the 9 species recognized, followed by descriptions of the adult beetles, with notes on distribution, host plants and larval and adult galleries. [Cf. *For Abstr.* 11 (Nos. 170–1).]

1914. NAKASHIMA, T. **[Ecological studies on *Anomala* species (Scarabaeidae) in Hokkaido.]** *Res. Bull. Exp. For. Hokkaido Univ.* 16 (1), 1952. pp. 115 + 9 plates. 225 refs. [Jap.e.]

Describes 9 species with notes on their ecology and distribution in Hokkaido.

1915. GREGOR, F., and NOVAK, V. Jednoduchá metoda stanovení poměru pohlaví housenic ploskohřbetky smrkové—*Cephaleia abietis* L. **[Simple method of determining the sex ratio in larvae of *C. abietis*.]** *Lesn. Práce* 31 (5), 1952 (221–4). [Cz.]

The authors have found that early ♀ instars of *C. abietis* are, as a rule, longer than the ♂ ones. The length of the body being, however, largely dependent on the health of the larva, the head width has been studied as a criterion for 329 larvae representing a homogeneous population, the sex being determined by a simplified dissecting technique (described in detail). The frequency histograms of head width for ♂ and ♀ have a similar form, displaying unimodal asymmetry. Since a small % of ♀s have a head width equal to that of the highest (and modal) values for the ♂s, the method recommended is (1) to separate the larvae into the largest and strongest (♀) on the one side, and the smallest and weakest (♂) on the other, (2) to measure in doubtful cases the head width, and continue the diagnosis on this basis, and (3) in very doubtful cases (ca. 10%) to resort to dissection. The error of the method is claimed to be ± 4%.

1916. HERON, R. J. **Notes on the feeding of larvae of the Larch sawfly, *Pristiphora erichsonii* (Htg.) (Hymenoptera: Tenthredinidae).** *Repr.* from *82nd Annual Report of the Entomological Society of*

Ontario 1951, 1952 (67–70). 9 refs. (*Contr. Div. For. Biol. Dep. Agric. Can.* No. 42.)

1917. WONG, H. R. **Cocoons of some sawflies that defoliate forest trees in Manitoba and Saskatchewan.** *Repr.* from *82nd Annual Report of the Entomological Society of Ontario 1951*, 1952 (61–7). (*Contr. Div. For. Biol. Dep. Agric. Can.* No. 31.)

A study undertaken to estimate the value of cocoons for determining the families and genera of sawflies that defoliate forest trees.

1918. MILLER, W. E. **Biological notes on five hymenopterous parasites of Pine bud and stem moths in Ohio.** *Ohio J. Sci.* 53 (1), 1953 (59–63). 7 refs. C.G.B.

Notes on: (1) *Calliephialtes comstockii*, a parasite of *Rhyacionia buoliana*, *R. rigidana* and *Petrova comstockiana*; (2) *Eurytoma tylodermatis*, a parasite of *R. buoliana* and *R. rigidana*; (3) *Hyssopus thymus*, a parasite of *R. buoliana* and *P. comstockiana*; (4) *Agathis pini*, a parasite of *P. comstockiana*; and (5) *Perilampus fulvicornis*, a secondary parasite of *P. comstockiana* through *A. pini*.

15. ANIMAL ECOLOGY (INCLUDING GAME AND FISH MANAGEMENT, HUNTING, SHOOTING AND FISHING)

See also Nos. 2371–3, 2419 *et seq.*, 2441–3.

1919. EDWARDS, R. Y. **An aerial moose census.** *Res. Notes B.C. For. Serv.* No. 23, 1952. pp. 9.

1920. SCOTT, D. R. M., and FOWLE, C. D. **The correlation of silvicultural systems and wildlife management.** *For. Chron.* 28 (4), 1952 (79–84). 26 refs.

A discussion of North American practice.

1921. KORTZ, A. Pengelolaan hutan djati di-Djawa dan margasatwa. **[Teak forest management in Java and wildlife conservation.]** *Rimba Indonesia* 1 (5), 1952 (230–4). [Jav.e.]

Recommends the establishment of game reserves in areas where the soil is swampy or salty and unsuited for Teak, and the strips along creeks planted with species other than Teak. In stands of Teak with *Leucaena glauca* both cover and food are inadequate.

16. GENERAL BOTANY

160. *Plant Chemistry*

See also Nos. 1880, 1929, 1931–5, 1937–8, 2008, 2014, 2210, 2344, 2372–3, 2403, 2634 *et seq.* 2890 *et seq.*

1922. MAŘAN, B. Vyživa lesních dřevin na rendzinách Karlštejnska. **[Nutrition of forest trees on the rendzinas of the Karlštejn area.]** *Zpr. výzkum. Úst. lesn. ČSR* No. 3, 1949 (75–107). 50 refs. [Cz.russ.e.]

Presents the tabulated results of analyses of foliage, wood, and bark of *Fraxinus excelsior*, *Populus tremula*, *Acer platanoides*, *Tilia cordata*, *Cornus mas*, *Carpinus betulus*, *Sorbus torminalis*, *Betula verrucosa*, *Quercus pubescens*, and *Picea abies*, at various levels between root collar and top, for trees growing on rendzinas of the Karlštejn area. In the foliage, the mineral content was found to be greater than on carbonate-free soils and, in general, greater than that listed in literature. The highest proportion of mineral nutrients was found in the foliage of *F. excelsior*, and the lowest, in *B. verrucosa*. The proportion of Ca in the foliage decreases as the proportion of acids increases. The content of mineral nutrients in the wood was found to be much less than in foliage, the respective ratios varying between 1/4 and 1/14. In young wood (tops) the mineral content is 10–30% higher than in old wood, and rises the higher the thinner the stem. The greatest differences are observed for Ca and K. The wood of Lime contains the largest proportion of ash, Pine the smallest. The mineral content of bark was found to be much greater than on carbonate-free soils and than that usually given in literature. Young bark contains more minerals than old, and old bark more than dead bark. The bark of Hornbeam has the highest ash content, that of Pine the lowest.

161. *Physiology*

See also Nos. 1941, 2006, 2013–4, 2026, 2250, 2608.

1923. HEWITT, E. J. **Sand and water culture methods used in the study of plant nutrition.** *Tech. Commun. Bur. Hort. Plantat. Crops, E. Malling* No. 22, 1952. pp. x + 241 + 9 photos. Many refs. Price £2. 2*s.* or $6·25.

1924. SHIBAMOTO, T., and KAWANA, A. **[The influence of aeration on the water culture of *Cinnamomum camphora* Sieb. (I) Efficacy of some preventive measures against root rot of *C. camphora*.]** *Bull. Tokyo Univ. For.* No. 41, 1951 (47–50). 7 refs. [Jap.e.]

Experiments showed that supplying O by aeration or adding H_2O_2 to the nutrient solution effectively prevented root rot of seedlings. *From authors' summary.*

1925. SHIBAMOTO, T., and KAWANA, A. **[The influence of aeration on the water culture of *Cinnamomum camphora* Sieb. (II). The amount of oxygen absorbed by roots of seedlings.]** *Bull. Tokyo Univ. For.* No. 43, 1952 (101–4). 11 refs. [Jap.jap.e.]

The amount of O absorbed by roots of seedlings of *Pinus densiflora*, *Cryptomeria japonica*, *Cinnamomum camphora* and *Zelkowa serrata* cultured in nutrient solution was measured. When the leaves were exposed to sunlight no difference was found between roots in nutrient solution and in distilled water. *Z. serrata* showed a higher respiration rate when the leaves were in sunlight than when they were in darkness; the other species did not. There were specific differences between rates of respiration, that of *Cinnamomum camphora* being the highest. *From authors' summary.*

1926. PRESTON, R. D. **Movement of water in higher plants.** *Repr.* from *Deformation and flow in biological systems*, edited by A. Frey-Wyssling, North-Holland Publishing Company, Amsterdam. 1952. pp. 257–321. X.

A review of past and present theories, with particular reference to the movement of water in trees. The author concludes that the classical cohesion theory must be discarded, and that only the living xylem is involved in water transport.

1927. RINGOET, A. Recherches sur la transpiration et le bilan d'eau de quelques plantes tropicales (palmier à huile, caféier, cacaoyer etc.). **[Studies on transpiration and water balance of some tropical plants (*Elaeis guineensis, Coffea canephora, Theobroma cacao* etc.).]** *Publ. Inst. nat. Étude agron. Congo belge* (*Sér. sci.*) No. 56, 1952. 42 refs. [F.] Price *Fr.*140·00.

Based on the author's researches at Yangambi. The work is in 4 parts. (1) *A critical study of the methods of measuring transpiration* (by potometer, by weighing parts of the plant, by weighing the whole plant). (2) *An ecological study of transpiration* (experimental conditions; researches on *E. guineensis, C. canephora*, and *T. cacao, Palisota thyrsiflora, Paspalum conjugatum*, and *Pueraria javanica*, comprising the daily rhythm of transpiration, seasonal variation, and the influence of (*a*) shade, (*b*) soil moisture). (3) *The rôle and importance of water to the plant:* (*a*) stomatic functioning; (*b*) direct use of water by the aerial organs; (*c*) the hydratation (difference between fresh and dry weight) of the tissues and its diurnal variation; (*d*) the growth of plants as a function of soil moisture. (4) *Researches on the water balance of E. guineensis:* (*a*) the elements of a water balance; (*b*) transpiration coefficients of *E. guineensis*; (*c*) transpiration and water balance of a single tree and of a stand of *E. guineensis*.

1928. PENMAN, H. L., and SCHOFIELD, R. K. **Some physical aspects of assimilation and transpiration.** *Symposia of the Society for Experimental Biology, Cambridge* No. 5, 1951 (115–29). 11 refs. [Rothamsted Experimental Station.] O.R.E.

1929. GODNEV, T. N., and TERENTJEVA, M. V. O soderžanii hlorofilla v počkah drevesnyh rasteniĭ v zimnee i vesennee vremja. **[The chlorophyll content of buds of woody plants in winter and spring.]** *Dokl. Akad. Nauk SSSR* 83 (3), 1952 (481–4). 4 refs. [Russ.] A.P.B.

Tabulates data on the chlorophyll a and b, carotene and xanthophyll contents of dormant buds of *Tilia cordata, Sambucus nigra, Quercus robur, Syringa vulgaris, Acer platanoides, Ulmus* sp. and *Alnus glutinosa*, and of dormant and swelling buds of *Populus canadensis, Betula verrucosa, Carpinus betulus, Sorbus aucuparia* and *Aesculus hippocastanum*. Though the contents of all pigments increased at the bud-swelling stage, the ratios of one to another remained almost constant, suggesting that they form a single complex of associated compounds.

1930. FREELAND, R. O. **Effect of age of leaves upon the rate of photosynthesis in some conifers.** *Plant Physiol.* 27 (4), 1952 (685–90). 5 refs. O.B.D.

Photosynthesis in segments of different ages cut from branches of *Pinus sylvestris, P. strobus, P. nigra, P. ponderosa, Abies concolor* and *Picea pungens* was studied by measuring the difference in CO_2 content of air before and after it had passed over the leaves. Rates of photosynthesis were calculated on the basis of a unit number of leaves. For all the species investigated the leaves attained a rate of photosynthesis at or near the maximum by the time of apparent leaf maturity during the first season of growth. The photosynthetic capacity of the leaves decreases with increased age, beginning during the second year; nevertheless it is still appreciable in conifer leaves 3 years old.

1931. ANDO, A. **[The seasonal variation of nutrient elements in Sugi and Hinoki seedlings.]** *Bull. Tokyo Univ. For.* No. 42, 1952 (151–61). 15 refs. [Jap.e.]

Year-old seedlings of Sugi (*Cryptomeria japonica*) and Hinoki (*Chamaecyparis obtusa*) were sampled at monthly intervals, from May to October, to determine dry weight and contents of ash, N, P_2O_5, K_2O and CaO in the shoot and root. (1) Dry weight and stem diameter increased gradually until growth ceased, the increase being particularly large towards the end of the growing season, although shoot and root elongation were negligible from August. (2) Water content was highest in June, decreasing gradually, and was higher in Sugi than in Hinoki. (3) Ash contents of both species increased considerably, late in the growing season. Ash % reached a maximum in May, decreasing afterwards, and was higher in Sugi than in Hinoki, and in root than in shoot. (4) Both species showed a maximum intake of N in the middle and later periods of growth, of P_2O_5 in the early and late periods, of K_2O in the middle and of CaO in the late period. (5) The N % was highest in August and lowest in September, P_2O_5 and K_2O % were highest in May, then decreasing, and the CaO % was highest in the middle period of growth. (6) In October, % of nutrient elements in both species were in the following descending order: CaO, N, K_2O, P_2O_5. CaO, N and P_2O_5 were higher in Hinoki than in Sugi, but there was no clear difference for K_2O. (7) P_2O_5, K_2O and CaO were higher in roots than in shoots, but N was higher in shoots. In May extremely high P_2O_5 and K_2O % were observed in roots. *From author's summary.*

1932. NAKATSUKA, T. **[Experiments on the growth and seasonal variation of nitrogen and phosphorus contents of Akamatsu seedlings. I.]** *J. Jap. For. Soc.* 34 (10), 1952 (326–7). [Jap.]

Pinus densiflora was sown in April 1942 and the seedlings sampled every few months from July 1942 till May 1944. Results are tabulated for leaf, stem, and root separately, for 14 seedlings.

1933. SATOO, T., and TAKEGOSI, T. Sirakasi to Kunugi no takuwaerareta denpun no kisetu ni yoru masiheri. **[Seasonal change of starch content in *Quercus myrsinaefolia* and *Q. acutissima*.]** *Misc. Inform. Tokyo Univ. For.* No. 9, 1952 (17–23 + 8 photos). 12 refs. [Jap.jap.e.]

Seasonal changes in starch content (s.c.) of an evergreen and a deciduous Oak, *Q. myrsinaefolia* and *Q. acutissima* respectively, were studied from samples collected twice a month and examined microscopically. Starch was most abundant in the pith and the rays, and seasonal changes were most noticeable here. In both species the s.c. decreased

suddenly in spring after the buds opened (correlatable with their poor sprouting when felled in the growing season). In *Q. acutissima*, s.c. was at a minimum in the roots and branches in early winter and in spring, and in the trunk in spring. Changes in s.c. were most noticeable in branches and twigs. Between July and September the s.c. stopped increasing and in some parts decreased, coinciding with the Lammas growth. In *Q. myrsinaefolia*, accumulation of starch was observed before the buds opened and not again until winter. The fall in s.c. in spring was more sudden, and the spring minimum earlier, in *Q. acutissima*.

1934. MEEUSE, J. D. **The amylolytic action of Maple and Birch saps.** *Acta bot. neerland.* 1 (2), 1952 (216–21). 9 refs. O.B.D.

By means of filter-paper chromatography and dialysis experiments combined with fermentation procedures, it was shown that Maple sap contains an enzyme producing maltose but not cellobiose from starch. Birch sap contains an enzyme system converting starch into a mixture of maltose, glucose and dextrins, again without production of cellobiose. The amylases of Maple and Birch sap probably belong to the *a*-group. *Author's summary.*

1935. GOO, M., and NEGISI, K. **Changes of reserve foods in seeds of Kuromatsu (*Pinus thunbergii* Parl.) during the course of germination.** *Bull. Tokyo Univ. For.* No. 43, 1952 (83–9). 5 refs. [E.e.jap.]

Quantitative analyses for fats, total N, total sugars and starch were made at 7 stages during germination, embryo and endosperm being analysed separately. The reserve foods were found to consist mainly of fats and protein, with a small quantity of sugars and other substances. During germination, the fats decreased in both embryo and endosperm. Most of the N moved from the endosperm to the embryo, but its total quantity in the entire seed decreased comparatively little. Most changes occurred after the radicle appeared but there was a slight decrease in the fat content and increase in total N in the embryo during the first 2 days after the seeds were placed in a germinator, probably caused by decomposition of the fats in the embryo and the movement of N from the endosperm. The curves for the decrease of fats and of N in the endosperm are very similar, suggesting the existence of some relationship between them. [Cf. *For. Abstr.* 14 (No. 2026).]

1936. GOO, M. **[When does cell division begin in the germinating seeds of *Pinus thunbergii* Parl.?]** *J. Jap. For. Soc.* 34 (1), 1952 (3). 1 ref. [E.jap.]

Seeds were treated and their water absorption was measured as in a previous experiment [cf. *For. Abstr.* 13 (No. 1049)], and samples with absorbed water ranging from 16 to 45% of their original weight were examined. Cell division in root initial, epicotyl, cotyledon, pith, procambium and cortex was first observed when the water absorbed amounted to 26% of the original weight, and shortly afterwards also in the root cap. Cell division took place during the period when the weight increased slowly or not at all and is assumed to be caused by the physiological process originating from the water absorbed during the first 2 days.

1937. MAUNEY, W. S. H., MILLER, C. O., SKOOG, F., CLAYTON, R. A., and STRONG, F. M. **Bioassay, purification, and properties of a growth factor from Coconut.** *Physiol. Plant., Copenhagen* 5 (4), 1952 (485–97). 13 refs. [E.e.]

Evidence to date indicates that the growth substance present in coconuts is a heat-stable, acid- and alkali-labile, non-volatile, water-soluble, organic compound.

1938. SATOO, S. **[The inhibiting effect of water extractives from the branches of some trees on the rooting of Willow cuttings.]** *J. Jap. For. Soc.* 34 (6), 1952 (187–8). 1 ref. [Jap.e.]

Rooting of cuttings of *Salix babylonica* was inhibited by water extractives from branches of *Castanea crenata* and *S. babylonica*, but not by those from branches of *Pinus densiflora*. Results are shown in a table with English legends.

162. *Pathology. Teratology*

1939. ILLIES, Z. M. Keimlingsabnormitäten bei *Picea abies* (L.) Karst. **[Seedling abnormalities in *P. abies*.]** *Z. Forstgenet.* 2 (2), 1953 (28–32). 6 refs. [G.g.e.]

Among the progeny of a number of free-pollinated Spruce, 41·9% were multiple seedlings, 28·8% were seedlings with reversed germination (cotyledons developing before the radicle) and 12·1% were thickened seedlings. The frequency of occurrence of such abnormalities is discussed, and will be the object of future studies. [Cf. *For. Abstr.* 14 (No. 989).]

164. *Morphology*

See also No. 1952.

1940. SURTI, M. **Origin of adventitious roots in the stem of Mulberry (*Morus indica*).** *Abstr.* in *Proc. 37th Indian Sci. Congr., 1950*, Part III (80). C.G.B.

Describes the origin and development of roots developing on stem cuttings from the basal cut and from points in the nodes of the stem.

1941. MEIDNER, H. **An instrument for the continuous determination of leaf thickness changes in the field.** *J. exp. Bot.* 3 (9), 1952 (319–25). 6 refs. O.B.D.

Describes a gear-wheel type of instrument used for determining changes in leaf thickness in the field, and reports tests on 4 tree species. Changes varied with individual leaves. Collectively the leaves of one tree species differed in their thickness changes from those of the others. Changes in leaf thickness were mainly due to changes in the volumes of special water-storage tissues. Leaf water-content changes and leaf thickness changes determined simultaneously in the laboratory were well correlated, provided that the thickness changes did not exceed those occurring in the field. Several of the factors that induced changes in leaf thickness were measured. The march of leaf temperature was found to be correlated most closely with the march of leaf thickness. *From author's summary.*

1942. PIJL, L. VAN DER. **The leaf of *Bauhinia*.** *Acta bot. neerland.* 1 (2), 1952 (287–309). 12 refs. O.B.D.

A morphological study.

1943. GREBINSKAJA, M. I. Stroenie semeni šelkovicy. [**Structure of the Mulberry seed.**] *Bot. Ž.* 37 (2), 1952 (214–9). 8 refs. [Russ.] C.G.B.

An illustrated description of seeds of *Morus alba*, *M. kagayamae*, *M. multicaulis* and *M. bombycis*, with tabulated data of germination and weight of seeds.

165. *Phylogeny, Evolution. Heredity, Genetics and Breeding, Variation*

See also Nos. 1939, 2018, 2030–2, 2036, 2128.

1944. SATO, K. [**Forest tree breeding.**] Asakura Book Company, Tokyo. Vols. 1 and 2, 1949. pp. 521. Many refs. [Jap.]

Vol. 1 discusses the theoretical foundation for tree breeding and contains chapters on: the difference between breeding forest trees and agricultural and garden plants; reproduction; variation; heredity; cytology; and the concept of race. The chapter on cytology includes a list (pp. 162–92) with literature references, of chromosome numbers of nearly 600 trees and shrubs; botanical names are given in Roman characters and the list can be used without a knowledge of Japanese. Vol. 2 deals with the problem of characterizing and identifying forest tree races including sero-diagnoses in woody species; the genetic and administrative aspects of forest seed procurement; and the general field of tree breeding including selection, hybridization, techniques for inducing mutations (including a discussion of the author's work on the use of fast neutron radiations) and chromosome alterations, and seed production and methods of influencing it. There is an extensive bibliography, in the form of footnotes, and author, species, and subject indexes.

1945. CHIBA, S. [**Preliminary report on a method of controlled pollination of *Cryptomeria japonica* D. Don by rooted cuttings bearing female flowers.**] *J. Jap. For. Soc.* 34 (9), 1952 (279–81). [Jap.e.]

Cuttings and scions having ♀ flower buds were taken from a 12- and a 40-year-old tree. All the flower buds on cuttings flowered normally and were pollinated. Many conelets ceased growing during the summer but some developed normally from spring to autumn. A little sound seed was produced from the cones and hybrid seedlings were obtained. The grafts also produced sound seeds.

1946. MEYER, H. Aufgaben und Wege der Douglasienzüchtung. [**Tasks and methods in breeding Douglas Fir.**] *Allg. Forstzeitschr.* 6 (27/28), 1951 (281–3). 9 refs. [G.]

A review of some American work, with notes on the aims and preliminary results of work in Germany. As regards selection for possible resistance to *Phaeocryptopus gäumannii* [cf. *For. Abstr.* 14 (Nos. 1324, 2413)], it is stated that a small 47-year-old stand has been found in the Ammerland district, Oldenburg, with natural regeneration remaining healthy despite the proximity of sources of infection, while the mother trees show excellent growth and crown and stem form. Scions have been taken from this stand and successfully grafted (a 90% take in a total of 400 grafts) in the greenhouse on 3-year-old stocks in pots. From these and other apparently resistant strains that may be found, it is intended eventually to form a seed orchard. As regards hybridization, it is pointed out that while 'green' Douglas Fir is not frost-hardy in all parts of Germany, there are some 'grey' ('*caesia*') forms that appear to be resistant to both *Rhabdocline* and frost, and also show good growth—e.g. 20-year-old trees at Gahrenberg (altitude 400 m.) of provenances Kamloops, B.C., and Skamania, Washington (alt. in both cases 1050 m.). By hybridization, it may therefore be possible to combine the desirable characters of these and the 'green' forms. Little work has so far been done on the induction of polyploidy in this species; the author has found it relatively easy, however, to obtain polyploid seedlings from seed treated for 24 hr. with 0·2% colchicine solution. These seedlings show thickening and shortening of cotyledons, hypocotyl and root, compared with diploids.

1947. CHIBA, S., and WATANABE, M. [**Tetraploids of *Larix leptolepis* that have appeared in the nurseries.**] *J. Jap. For. Soc.* 34 (9), 1952 (276–8). [Jap.e.]

Characteristics of 8 tetraploids discovered in 1951 are described, and the stage at which chromosome doubling probably took place is discussed. *From author's summary.*

1948. FAHMY, T. Y. Les chromosomes somatiques de *Cedrus atlantica*. [**The somatic chromosomes of *C. atlantica*.**] *Recueil des Travaux de la Faculté des Sciences de l'Université de Montpellier* (*Série Botanique*) No. 5, 1952 (103–8). 8 refs. [F.]

1949. MUKHERJEE, S. K. **Meiosis in *Azadirachta indica*.** *Curr. Sci.* 21 (10), 1952 (287). 2 refs. A.P.B.

Examination of pollen mother cells confirms the somatic chromosome number, $2n = 28$.

1950. LANGNER, W. Ein Beispiel unterschiedlicher züchterischer Bedeutung des Genotyp und Phänotyp in Land- und Forstwirtschaft. [**An example of differences in the genetic significance of the genotype and the phenotype in agriculture and in forestry.**] *Z. Forstgenet.* 2 (2), 1953 (25–8). 4 refs. [G.e.]

Discusses, on the basis of a segregation pattern, differences in the aims of the agricultural and forest plant breeder. For agricultural purposes the plant must breed true, whereas in forestry, since only a small majority of the crop comes to maturity for final utilization, it would be possible to use the whole theoretical population as it stands. According to the segregation pattern shown, individuals capable of developing into well-formed, resistant and thrifty trees is 42%, enough to guarantee a crop of phenotypically desirable trees. It is suggested also that populations containing at least a similar proportion of ideal phenotypes can be continually reproduced by forming seed plantations containing clones of grafts from plus trees. *From author's summary.*

1951. KRAUSS, G. A. Zur Frage der forstlichen Standortsrassen. **[Site races in the forest.]** *Forstwiss. Cbl.* 71 (11/12), 1952 (349–59). [G.]

Discusses different strains of Pine, Spruce, Larch, Beech, Alder and Fir known to exist in Germany, and the site factors giving rise to their development, and considers also the problem of restoring strains destroyed during the war.

1952. ČERNÝ, R., and POLNAR, M. Příspěvek k rozlišení smrku z různých nadmořských výšek. **[Distinguishing between Spruce from different altitudes.]** *Lesn. Práce* 30 (4), 1951 (319–28). [Cz.]

Analysis of the Spruce seeds and seedlings from various altitudes of the Krknoši (Riesengebirge) and Jesenik mountains, shows that the hypocotyl/cotyledon length ratio in the Spruce embryo increases with altitude. In seeds from lower altitudes, the hypocotyl is narrowed just under the cotyledons into a collar; a feature scarcely visible in seeds from higher altitudes. The shoot/root dry-weight ratio of seedlings decreases as the altitude increases, and so does the shoot/entire-plant dry-weight ratio. The moisture content of both the aerial and underground parts of the seedlings increases with altitude.

1953. HOFFMANN, D. Die Rolle des Photoperiodismus in der Forstpflanzenzüchtung. **[Photoperiodism in tree breeding.]** *Z. Forstgenet.* 2 (2), 1953 (44–7). [G.g.]

Observations of *Populus* spp. of varying provenance, both in the field and under glass, confirmed the supposition that photoperiodism is a hereditary factor. Hybrids with the same mother but different fathers had different reactions under the same length of daylight, which suggests that this is probably a case of nuclear inheritance. The significance of these facts for selective breeding of Poplars and other tree species is discussed.

166. *Economic Botany*

See also section 892.

1954. HILL, A. F. **Economic botany—a textbook of useful plants and plant products.** McGraw Hill Book Co. Inc., New York, Toronto, London. 2nd ed., 1952. pp. xii + 560. Price [£2.19*s.* 6*d.*]

1955. DASTUR, J. F. **Useful plants of India and Pakistan: a popular handbook of trees and plants of industrial, economic and commercial utility.** D. B. Taraporevala Sons & Co. Ltd., 210 Hornby Rd., Bombay. [1951.] pp. vi + 260. 49 refs. Price *Rs.*5 *as.*14.

With an appendix classifying plants under their uses and a species/subject index.

1956. PAREDES, A. Especies ecuatorianas de importancia industrial—ordenadas según el sistema de Wettstein. **[Species of Ecuador important to industry—arranged according to Wettstein's system.]** *Boletín del Instituto de Ciencias Naturales, Quito* 1 (1), 1952 (80–99). [Span.] C.G.B.

Short notes on trees, shrubs and plants, and their timber or other products.

168. *Histology*

See also Nos. 2601 *et seq.*, 2917.

1957. JACQUIOT, C. Sur les anomalies de la différentiation et de la lignification du tissu cambial de divers arbres cultivés *in vitro*. **[Anomalies of differentiation and lignification of the cambial tissue of different trees cultivated *in vitro*.]** *Bulletin, Association Technique de l'Industrie Papetière, Paris* 6 (1), 1952 (13–7 + 6 photos). 12 refs. [F.] L.S.

Results are presented of observations on *Betula verrucosa, Fagus sylvatica, Quercus sessiliflora, Q. robur, Tilia cordata* and *Ulmus campestris*. It has been found that, whatever the time of explantation, once the explantates of these species obtained by aseptic methods are placed on an agar medium containing sugar and mineral salts, the cambium resumes its activity, provided the temperature is suitable (ca. 25° C.). Unorganized parenchymatous tissue appears with islets of bast and ligneous tissue; at the same time, a regular newly formed tissue can be observed, with islets of differentiated and lignified cells. These cells are sometimes identical for the different species, but in other cases they are characteristic of a given tree. It has been found that the factors causing the latter phenomenon cannot be localized in other tissues found at the same level in the same tree. It is suggested that the differentiating agents have existed in small quantities in the tissues before their excision, or else that the callus regions, with their particularly active proliferation, can, even without forming any adventitious buds, produce the same substances as the buds do and exert a similar, though less intense, influence upon the tissues immediately below.

17. SYSTEMATIC BOTANY

172.8. Eumycetes (True Fungi)

See also Nos. 2375 *et seq.*, 2805 *et seq.*

1958. GÄUMANN, E. **The fungi: a description of their morphological features and evolutionary development.** Hafner Publishing Co., New York and London. 1952. pp. 420. 850 refs. Price £3. 12*s.* 6*d.*

A translation from the German [cf. *For. Abstr.* 11 (No. 922)] by *F. L. Wynd.*

1959. MACLEOD, D. M. **General investigations on criteria used for describing members of the genus *Beauveria*.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (5), 1952 (1).

1960. MACLEOD, D. M. **Taxonomy of *Beauveria* and *Tritirachium* species.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (6), 1952 (1–2).

From the evidence collected in an investigation on a number of species, it is concluded that the morphological and biological differences between these two genera are such as to warrant their being treated as separate groups. It is not certain whether or not both should be reduced to the rank of sub-genera.

1961. MCKEEN, C. G. **Studies of Canadian Thelephoraceae. IX. A cultural and taxonomic study of three species of *Peniophora*.** *Repr.* from *Canad. J. Bot.* 30 (6), 1952 (764–87).

Peniophora heterocystidia, *P. mutata*, and *P. populnea* are distinct though very similar species. *P. populnea* is restricted to the host genus *Populus*, and *P. heterocystidia* to broadleaved trees other than *Populus*. *P. allescheri* is combined with *P. mutata*. *P. mutata* isolated from *Populus* showed larger basidiospores and conidia than those from other hosts, but the difference was not great enough to justify the establishment of a variety. *From author's summary.*

1962. BAKSHI, B. K. ***Oedocephalum lineatum* is a conidial stage of *Fomes annosus*.** *Trans. Brit. mycol. Soc.* 35 (3), 1952 (195 + 1 plate). O.B.D.

Cf. *For. Abstr.* 12 (No. 1863).

1963. MAŃKA, K. Występujący na brzozach grzyb *Poria obliqua* (Pers.) Bres. i jego rozwój na sztucznych pożywkach. **[The Birch-attacking fungus *P. obliqua* and its development on artificial media.]** *Acta Soc. Bot. Polon.* 21 (3), 1952 (517–36). 15 refs. [Pol.pol.e.] C.G.B.

The fungus, isolated from sterile conks found on Birch stems in the virgin forest of Białowieża and in the Poznań district, was cultivated on artificial media. It fructified on the best medium after 4–6 weeks, as compared with ca. 7 months on Birch twigs. The optimum temperature seems to be ca. 30° C., the optimum pH = 7. At lower pH values the cultures were smaller but matured sooner.

1964. HAMADA, M. **[Physiology and ecology of *Armillaria matsutake*.]** *Bot. Mag., Tokyo* 63 (741/742), 1950 (40–1). [Jap.] I.M.I.

In pure culture, the limiting conditions of which are described.

1965. COOKE, W. B. **A survey of literature on fungus sociology and ecology. II.** *Ecology* 34 (1), 1953 (211–22). 63 refs.

A review of literature other than German (dealt with in an earlier article. [See *For. Abstr.* 10 (No. 1634).]).

1966. TALBOT, P. H. B. **Dispersal of fungus spores by small animals inhabiting wood and bark.** *Trans. Brit. mycol. Soc.* 35 (2), 1952 (123–8). 12 refs. O.B.D.

Experiments with woodlice, mites, centipedes, springtails and other small animals inhabiting the lower surfaces of fallen branches and humus, showed that many such animals habitually ingest fungus spores which are capable of germination after passage through the digestive tract. Such animals also transport spores on their bodies. Another mode of distribution is through the agency of water-splash. The investigations were undertaken with particular reference to resupinate hymenomycetes.

1967. SAVILE, D. B. O. **Short-season adaptations in the rust fungi.** *Mycologia* 45 (1), 1953 (75–87). 6 refs. P.R.

174. *Spermatophyta, Seed-Plants in General. Floras and Check-Lists*

1968. SAHNI, K. C. **Botanical exploration in the Great Nicobar Island.** *Indian For.* 79 (1), 1953 (1–16 + 8 photos).

Includes short notes on the forest types, and a list of species collected.

1969. Flore du Congo Belge et du Ruanda-Urundi. Spermatophytes. Vol. III. **[The flora of the Belgian Congo and of Ruanda-Urundi. Spermatophytes. Vol. III.]** *Publ. Inst. nat. Étude agron. Congo belge* 1952. pp. 579 + 17 photos + 40 sets of drawings. [F.]

Cf. *For. Abstr.* 13 (No. 2799).

1970. CAPON, M. Les noms vernaculaires des principales essences forestières à Yangambi (Turumbu). **[The Turumbu vernacular names of the chief forest species of Yangambi [Belgian Congo].]** *Bull. agric. Congo belge* 14 (1), 1953 (91–118). [F.flem.]

1971. PARDY, A. A. **Notes on indigenous trees and shrubs of Southern Rhodesia.** *Rhod. agric. J.* 49 (5; 6), 1952 (254–9; 316–7 + 15 plates). E.M.B.

Terminalia sericea, *Albizzia gummifera*, *Securidaca longipedunculata*, *Afrormosia angolensis*, *Zizyphus mucronata*, *Vangueriopsis lanciflora*, *Ricinodendron rautanenii*, and *Acacia karroo*. [Cf. *For. Abstr.* 14 (No. 1007).]

1972. DAYTON, W. A. **United States tree books: a bibliography of tree identification.** *Bibliogr. Bull. U.S. Dep. Agric.* No. 20, 1952. pp. 32.

1973. HILDEBRAND, F. H. Verbeterde boomnamenlijst van Samarinda (Oost-Borneo). **[Revised list of tree species from Samarinda (East Borneo).]** *Rapp. Bosbouwproefsta., Bogor* No. 58, 1952. pp. 107. [Jav.Du.E.]

The list is in two parts arranged (1) by vernacular names, and (2) under family, genus and species. Each gives the vernacular name, its language or dialect, the scientific name and durability class of the wood. [Cf. *For. Abstr.* 14 (No. 119).]

1974. BLACK, J. M. **Flora of South Australia. Part III (Second edition). Callitrichaceae—Plumbaginaceae.** Government Printer, Adelaide. 1952 (523–683). Price 8*s.* 6*d.*

Cf. *For. Abstr.* 11 (No. 899).

174.2. Gymnosperms

1975. LI, H.-L. **A reclassification of *Libocedrus* and Cupressaceae.** *J. Arnold Arbor.* 34 (1), 1953 (17–36). 38 refs.

The genus *Libocedrus* should be limited to those species, all of the Southern Hemisphere, that have 4 valvate cone-scales. Three species from New Guinea with ovulate scales bracteate below, and spirally arranged staminate scales indefinite in number, are segregated as a distinct genus *Papuacedrus*. The three northern species, with 6 imbricate cone-scales, constitute another genus, *Heyderia*. The family Cupressaceae can be reorganized into two subfamilies. The subfamily Callitroideae is composed of genera with valvate scales and can be divided into three tribes: Actinostrobeae, with ternate scales; Libocedreae, with paired or quadrate scales; and Tetraclineae, with paired dissimilar scales. The subfamily Cupressoideae is composed of genera with imbricate scales and can be divided into three tribes: Cupresseae with thick shield-like scales; Thujopsidae, with flat, more or less concave scales; and Junipereae, with fleshy scales coalescing at maturity. All genera of

the Callitroideae, with the exception of the isolated *Tetraclinis*, are of the Southern Hemisphere, while all genera of the Cupressoideae are of the Northern Hemisphere. The two groups are probably of remote relationship, having been long isolated and having developed independently, like many other groups of conifers. *From author's summary.*

1976. LITTLE, E. L., JR., and DORMAN, K. W. **Slash Pine (*Pinus elliottii*), its nomenclature and varieties.** *J. For.* 50 (12), 1952 (918–23). 11 refs.

The authors distinguish the Slash Pine of N. Florida (*Pinus elliottii*), and that of S. Florida (*P. elliottii* var. *densa* var. nov.) from the Slash Pine of the W. Indies and Central America (*P. caribaea*). A key to the two species and their varieties is given.

1977. LITTLE, E. L., JR. **The genus *Pseudotsuga* (Douglas-Fir) in North America.** *Leaflets of Western Botany, San Francisco, Calif.* 6 (10), 1952 (181–98). L.B.M.N.

Discusses chiefly questions of nomenclature, recognizing for this region only two species, viz. *P. macrocarpa* (endemic in S. California) and *P. taxifolia*. Under the latter, for which the recent combination *P. menziesii* [see *For. Abstr.* 13 (No. 105)] is rejected as invalid, two varieties are admitted, viz. the type—var. *taxifolia* ('Coast Douglas Fir'; syn. var. *viridis*), and var. *glauca* ('Rocky Mountain, Colorado, or Blue Douglas Fir', under which var. *caesia* is reduced to synonymy). A section is devoted to the names given by Flous, all of which are reduced to synonyms of one or other of the above names, and some notes are added on certain obscure names published by Roezl. [Cf. *For. Abstr.* 10 (No. 2500).]

1978. GRAY, N. E. **A taxonomic revision of *Podocarpus*. VII. The African species of *Podocarpus*: section *Afrocarpus*.** *J. Arnold Arbor.* 34 (1), 1953 (67–76). 18 refs.

176.1. Dicotyledons

1979. HOFMAN, J. Listnáče v létě. [**Hardwoods in summer.**] *Lesn. Knihovna* (*malá Řada*) No. 9, 1951. pp. 107. [Cz.] Price *Kčs.*38.

A key based on leaf characters for the determination of 150 indigenous and exotic broadleaved forest species growing in Czechoslovakia.

1980. SWART, J. J. **Novitates Burseracearum. II.** *Acta bot. neerland.* 1 (2), 1952 (244–9). O.B.D.

Includes descriptions of some new species of *Protium*.

1981. LI, H.-L. **The genus *Elaeagnus* in Formosa.** *Lloydia* 15 (3), 1952 (156–60). P.R.

Describes 8 species from Formosa and the adjacent small islands, of which two are proposed as new. A key is given, based on obvious vegetative characters.

1982. EM, H. Makedonski narodni iminja za vidovi od rodot *Quercus* (dabovi). [**Macedonian names of *Quercus* species.**] *God. Zborn. zemj.-šum. Univ. Skopje* No. 3, 1951 (71–81). 7 refs. [Maced.g.]

Suggests Macedonian names for the genus *Quercus*, and for the following species: *Q. coccifera, cerris, lanuginosa, sessiliflora, conferta*, and *robur*.

1983. SMITH, A. C. **Studies of Pacific Island plants, XIV. Notes on the Fijian species of *Cyrtandra*.** *J. Arnold Arbor.* 34 (1), 1953 (37–51).

1984. DUCKE, A. Notas sôbre a flora neotrópica —II. As Leguminosas da Amazônia brasileira. [**Notes on the neotropical flora—II. The Leguminosae of Brazilian Amazonia.**] *Bol. tec. Inst. agron. Norte* No. 18, 1949 (1–248). [Port.]

A botanical study with an alphabetical list of vernacular names.

1985. LÉONARD, J. **Notulae systematicae. XIII. Caesalpiniaceae africanae (*Cynometra, Didelotia, Zingania, Cryptosepalum, Pynaertiodendron*).** *Bull. Jard. bot. Brux.* 22 (3/4), 1952 (201–10). [F.] O.B.D.

1986. BRENAN, J. P. M. **The *Albizzia gummifera* complex.** *Kew Bull.* 1950 (4), (507–37 + 2 plates).

The author demonstrates that there are 3 distinct species involved in *A. gummifera* together with a variety and an assortment of hybrids. These are described and data are presented on their distribution.

1987. CLAVERIA, J. R. **Notes on Narra (*Pterocarpus* spp.).** *Philipp. J. For.* 7 (1/4), 1950 (1952), (31–41 + 2 photos). 7 refs.

Includes botanical notes, notes on the timber and its uses, silvicultural characteristics and propagation.

1988. SMITH, A. C. **Studies of Pacific Island plants, X. The Meliaceae of Fiji, Samoa and Tonga.** *Contr. U.S. nat. Herb.* 30 (4), 1952 (469–522). O.B.D.

A botanical study including notes on distribution, local names and uses.

1989. GARDNER, C. A. **Trees of Western Australia. Nos. 7 and 8. The Gimlet Trees (*Eucalyptus salubris* F. Muell and *E. campaspe* S. Moore). No. 9. The Pear-fruited Mallee (*Eucalyptus pyriformis* Turcz.).** *Leafl. Dep. Agric. W. Aust.* No. 2015, 1952. pp. 7.

1990. GARDNER, C. A. **Trees of Western Australia. Nos. 10 and 11. The Swamp or Flat-topped Yate (*Eucalyptus occidentalis* Endl.) and the Brown Mallet (*Eucalyptus astringens* Maiden).** *Leafl. Dep. Agric. W. Aust.* No. 2020, 1952. pp. 6.

1991. STEENIS, C. G. G. J. VAN. ***Kjellbergiodendron* and *Whiteodendron*, Malaysian Myrtaceae—Leptospermoideae Metrosiderinae.** *Acta bot. neerland.* 1 (2), 1952 (435–42). 9 refs. O.B.D.

Erects a new genus *Whiteodendron* to cover *W. moultonianum* (= *Tristania moultoniana* W. W. Smith).

1992. CUFODONTIS, G. Revision der afrikanischen Arten von *Pittosporum*. [**Revision of the African species of *Pittosporum*.**] *Repr.* from *Feddes Repertorium, Berlin* 55 (1), 1952 (27–113). 85 refs. [G.]

Includes one new species, *P. lynesii*, from Tanganyika, and several new subspp. and new

combinations under *P. viridiflorum* and *P. abyssinicum*. Keys and descriptions are given in Latin.

1993. POURTET, J. Les peupliers en Yougoslavie. [**Poplars in Jugoslavia.**] *Rev. for. franç.* 1952 (12), (819–26 + 4 photos). [F.]

A brief account of the Poplars occurring naturally, and cultivated, in Jugoslavia. The native species include two subspecies of *P. alba*, a hybrid *P. alba* × *P. tremula*, and *P. nigra*.

1994. BAILEY, I. W., and SMITH, A. C. **A new Fijian species of *Calyptosepalum*.** *J. Arnold Arbor.* 34 (1), 1953 (52–66). 5 refs.

C. pacificum closely resembles *C. sumatranum* collected in Sumatra in 1880–2. The taxonomic position of the genus is discussed.

1995. MONACHINO, J. V. **The South American species of *Manilkara*.** *Phytologia* 4 (2), 1952 (94–118). 33 refs. A.P.B.

A revision, proposing 3 new species, with a key, descriptions, and synonymy.

1996. STAFLEU, F. A. **A monograph of the Vochysiaceae. II. *Callisthene*.** *Acta bot. neerland.* 1 (2), 1952 (222–42). 33 refs. O.B.D.

Morphology, distribution, nomenclature and taxonomy, with keys to the species.

18. PLANT ECOLOGY

See also Nos. 1867, 1871–4.

1997. MEZERA, A. Rostliny našich lesů. [**Plants of Czechoslovakian forests.**] *Lesn. Knihovna* (*malá Řada*) No. 19, 1952. pp. 502 + 140 drawings. 212 refs. [Cz.] Price *Kčs*.430.

This book, illustrated by 140 coloured plates, includes the following sections: floristic regions and components of the Central-European flora; relations between site conditions and plants or plant communities; plants as indicators of the nutrient content of the soil and its physical and chemical properties; indicators of 'sick', degraded, and podzolized soils; site class according to indicator plants, and forest types; the forest as a living community; natural forests; survey of Central-European forest communities. The legends to the plates include the ecological significance and distribution of the respective indicator plants in Czechoslovak forests. There are indexes to Czech and Latin names of the plants mentioned.

181. *Mode of Life, Autecology. Silvicultural Characters of Trees*

See also Nos. 1987, 2121, 2588.

1998. MARCET, E. Zum ökologischen Verhalten verschiedener Pappelsorten. [**The ecological behaviour of several kinds of Poplar.**] *Schweiz. Z. Forstw.* 103 (11), 1952 (425–31 + 5 photos). [G.]

A small-scale experiment was made on cuttings raised in water, of 4 Poplars: (1) Wettstein's hybrid *angulata* × *trichocarpa*, (2) a Balsam Poplar [? *tacamahaca*], (3) a Black Poplar hybrid from Chablais bei Murten, and (4) a Black Poplar hybrid from Marais de Poitevin, France. The characters investigated were flushing, root development, and shoot growth.

1999. SLAVNIĆ, Ž. O ekologiji bahofenove topole. [**Ecology of *Populus bachofeni*.**] *Šum. List* 76 (1/3), 1952 (35–42). 5 refs. [Croat.croat.g.]

This species, variety, or hybrid occurs in the Deliblatski Pesok area (Banat, N.W. Jugoslavia) within the following communities: (1) with *P. nigra* in the association *Populetum nigro-albae*; (2) with *P. alba* in the same association; (3) with Alder and Birch in Ash/Elm forests, and (4) in the Deliblat Lime/Oak forest, the first three being the natural sites. It reaches its optimum growth in (2) on sand with a little humus, on periodically flooded sites. The maximum frequency is found in (3) on sites with short-duration flooding. Site types (1) and (4) are the limits of humidity and aridity respectively.

2000. SUNJOTO WIROATMODJO, R. Hal djenis kaju industri di Djawa-Timur. [**Wood species for industry in E. Java.**] *Rimba Indonesia* 1 (5), 1952 (197–214). 7 refs. [Jav.jav.e.]

Discusses the increased planting of commercial species since 1930, and lists species used for different industries, with their altitude, rainfall and soil requirements.

181.1. Distribution, Natural Range

See also Nos. 2005, 2041, 2099.

2001. BERJAOUI, A. La distribution des essences forestières au Liban. [**The distribution of forest species in Lebanon.**] *Rev. for. franç.* 1952 (12), (833–7). [F.]

2002. BANERJI, M. L. **Observations on the distribution of gymnosperms in eastern Nepal.** *Journal of the Bombay Natural History Society, Bombay* 51 (1), 1952 (156–9 + 1 map). 9 refs. O.R.S.

2003. GRANT, J. **Occurrence of Tamarack in central British Columbia.** *Canadian Field Naturalist, Ottawa* 65 (5), 1951 (185). B.A.P.

Records the occurrence of *Larix laricina* west of the Rocky Mountains in the Prince George district of central B.C.

2004. HUECK, K. Die Araukarienwälder des nördlichen Patagonien. [**The *Araucaria* forests of N. Patagonia.**] *Z. Weltforstwirt.* 15 (4), 1952 (163–7). [G.e.f.]

Discusses the distribution, and more briefly the exploitation and uses of *A. araucana*.

181.2. Atmospheric Relations. Acclimatization

See also Nos. 1953, 2110 *et seq.*

2005. MIYOSHI, T. [**Ecological studies on the qualities of the timber of Hinoki, *Chamaecyparis obtusa* Sieb. et Zucc.: general remarks.**] *Bull. Tokyo Univ. For.* No. 42, 1952 (1–128 + 3 gphs. + 1 photo + 1 map). [Jap.e.]

Summarizes the work of the author since 1929 on ecological factors, anatomical features, and physical, chemical and mechanical properties. Results of ecological studies [described in *Bulletin of the Forest Experiment Station of the Imperial Household* 2 (1), 1932 (in Japanese)] include the following: (1) Hinoki is found between the districts of Kyushu and Ou; its altitudinal distribution varies with location, ranging in the Kiso district from 200 to

1600 m. (2) Hinoki begins its growth when the mean of the maximum and minimum air temperature in a day reaches 15° C. in spring, and stops growing at the same mean day temperature in autumn. Increment changes run parallel throughout the growing season to those of the temperature expressed as a mean of daily maximum and minimum temperatures. The Hinoki temperature factor is calculated from the average of this temperature above 15° C. during the growth period and the precipitation factor from the average day precipitation during the period. The localities are classified as A_1 (temperature factor 2·0–3·5), A_2 (3·6–5), B (5·1–7·0), and C (7·1–9·0), and as α (precipitation factor 3–6; dry), β (7–10; fresh) and γ (over 11; moist). (3) The upper and lower limits of vertical distribution and favourable sites for Hinoki are indicated numerically by the iso-temperature and iso-precipitation factor lines; on the basis of these ecological findings, 36 standard specimens and over 300 supplementary specimens were collected from the whole country and used for research on wood properties. Results of research on anatomical features [*Bulletin of the Forest Experiment Station of the Imperial Household* 2 (3), 1934 (in Japanese)] and on physical, chemical and mechanical properties [cf. *For. Abstr.* 14 (No. 2658)] are tabulated showing the differences between samples from localities A_1, A_2, and B. *From author's summary.*

2006. WILNER, J. **The effects of seasonal and cultural variations on maturity of woody plants commonly grown on the Canadian prairies.** *Sci. Agric.* 32 (11), 1952 (568–73). 8 refs. [Forest Nursery Station, Indian Head, Sask.] O.R.E.

Mature twigs taken during the winter of 1950, 1951 and 1952 from a number of species grown for windbreaks or ornamental purposes on the Canadian prairies, were studied for their water content. The results indicate a certain constancy in water content of mature twigs irrespective of seasonal variations. Mulching and wider spacing than the usual 4 × 4 ft. in windbreaks did not, in most cases, greatly affect the water content of the mature twigs. Since wood maturity (i.e. relatively low water content) is a factor in winter survival, careful selection of plants having such characteristics for planting in prairie regions is more important than the introduction of special cultural treatments.

2007. VENEMA, H. J. Ervaringen met de cultuur van *Metasequoia glyptostroboides* Hu et Cheng in Nederland. [**The cultivation of *M. glyptostroboides* in Holland.**] *Jaarb. ned. dendrol. Ver. 1950–51* 18, [1952?] (89–92). [Du.e.]

Notes on the history of the introduction of this species, its propagation (including propagation by cuttings) and behaviour to date. It is as yet uncertain whether it will prove winter-hardy.

181.3. Water, Soil and Root Relations (including Bacterial and Mycorrhizal Symbiosis)

See also Nos. 1880, 1927, 2030, 2103, 2210, 2343–5.

2008. OVINGTON, J. D. **Studies of the development of woodland conditions under different trees. 1. Soils pH.** *J. Ecol.* 41 (1), 1953 (13–34 + 2 photos). 17 refs.

Data were collected from 5 sites in England and Wales in areas of different climates and on soils differing considerably between sites in their chemical and physical characteristics. At each site a number of forest plots with closed canopy have been established When examined in the field, the soils appear to be little influenced by the different tree species except that under the forest stands a surface layer of unincorporated material has been superimposed above the mineral soil, the nature and amount of which is largely dependent upon the tree species. On the acid sites, the leaves of each species have a characteristic pH, and the difference between species is considerable, but on the less acid sites the leaves show little variation in pH. The acidity of the leaves of individual tree species varies from site to site and is clearly related to the acidity of the underlying mineral soil. The most acid leaves were those of *Pseudotsuga taxifolia* and *Pinus nigra* at Bedgebury, and in general the leaves of conifers are more acid than those of the hardwoods, but exceptions to this rule occur, e.g. *Picea abies* and *P. sitchensis*. The surface litter showed a correlation in pH with the mineral soil similar to that of fresh leaves, but on most plots the fresh leaves were less acid than the litter, the acidity of which is increased in the lower, more decomposed material.

At each site there were significant differences in the pH gradients down the profiles of the various plots, and these can be largely attributed to the influence of the different tree species. The general trend is for conifers to intensify the increased acidity of the upper soil to a greater extent than the hardwoods. The changes in soil pH which follow the development of woodland conditions appear not to be directly related to the pH of fresh leaves and surface litter; e.g. except for Beech, *Picea sitchensis* had the least acid leaves and litter at Powis, and yet the soil in this plot showed the greatest increase of acidity. *From author's summary.*

2009. KOVRIGIN, S. A. Dynamika nitratov, ammonija i podvižnyh form fosfora i kalija v počvah pod različnymi drevesnymi porodami. [**The dynamics of nitrates, ammonium and 'mobile' forms of phosphorus and potassium in soils under various tree species.**] *Počvoved.* 1952 (7), (628–42). 13 refs. [Russ.russ.] A.P.B.

Describes the vegetation and soil profiles found under pure groups of Scots Pine, Norway Spruce, Oak, Birch and Aspen, on podzolic soils in the Bryansk Forestry Institute's experimental forest, and gives analytical results for the A_0^3 (humus (H) layer) and the A_1 horizons, sampled at roughly monthly intervals from April to November 1948. The A_0^3 horizon was included since it contained many active roots of the trees and associated herbaceous vegetation. Nitrates and nitrites played no material part in the N nutrition of any of the plots, and the only significant nitrification occurred at the start of the growing season in humus under Birch. At most times of sampling the NH_4 and 'mobile' K_2O and P_2O_5 content of the A_0^3, expressed in %, were much higher than those of the A_1. Their absolute

contents, however, based on weight in the whole of the horizons, were much lower in A_0^3 than in A_1. The maxima for A_0^3, in % of the absolute total contents in $A_0^3 + A_1$, were: for NH_4 – 25 (Pine), 21 (Aspen), and 16 (Oak), all on 23 September, and 16 (Spruce) on 7 May; for the other nutrients the maximum figures were still lower, e.g. for K_2O, 15 (Spruce, 23 September) and for P_2O_5, 13 (Pine, 30 June). The minimum contents of these nutrients in $A_0^3 + A_1$, occurred mainly towards the end of June, following the period of most intense growth and flowering and—presumably—the maximum activity by soil micro-organisms; the maxima, in the period July to mid-August (except for decreases in time of drought). A decrease occurred during the cool rainy autumn, presumably owing to leaching. When the freshly fallen litter began to accumulate in autumn, a very marked rise in the NH_4 content of A_0^3 occurred under all species, but only under Birch and Spruce was there a corresponding increase of the NH_4 content of $A_0^3 + A_1$. By 13 November NH_4 was very low in both A_0^3 and A_1 under all species, and the fate of the preceding accumulation in A_0^3 is problematical. For the whole growing season the highest average values for the 3 nutrients together, were found in the soil under Birch and Oak, in that order, the average values for the remaining species being much lower.

2010. Bunuševac, T., and Antić, M. Uticaj kultura nekih vrsta šumskog drveća na edafske uslove Deliblatske Peščare. **[Effect of afforestation with various tree species on edaphic conditions in the Deliblato Sands area.]** *Glasn. šum. Fak., Beograd* No. 3, 1951 (129–60). 5 refs. [Serb.f.]

The Deliblato Sands in the Vojvodina (N.E. Jugoslavia) have an area of 24,854 ha. and are characterized by a series of parallel dunes in the direction N.W–S.E. The highest points reach nearly 200 m. The annual precipitation is 653 mm., the bulk of which falls in May–August. The mean annual temperature varies from 9·5 to 11° C., with annual amplitudes from 21 to 67°. Diurnal amplitudes are also very high, reaching 24°. Late frosts persist until the second half of June, and autumn frosts start in early October. A dry S.E. wind blows during the colder half of the year, not seldom for 2–3 weeks on end. Afforestation began in 1808 when F. Bachoffen worked out the first plan. The following species have been used: (1) *Pinus sylvestris*, (2) *P. nigra*, (3) *Robinia pseudoacacia*, (4) *Juniperus virginiana*, (5) *Fraxinus americana*, and also *F. excelsior*, *F. ornus*, *Pinus strobus*, *P. banksiana*, *P. jeffreyi*, *Sophora japonica*, *Populus nigra*, *P. alba*, *P. canescens*, *P. canadensis*, *P. bachofeni*, *Ailanthus altissima*, *Acer saccharum*, *Prunus serotina*, *P. mahaleb*, *Gleditsia triacanthos*, and *Morus alba*. Stands of the first five species mentioned were the object of investigation, based on the assumption that all stands observed had the same climatic and soil conditions. Beside mensurational data for the stands, the following pedological determinations were made: $CaCO_3$, pH (in water), humus, assimilable P_2O_5, and assimilable K_2O; soil profiles were also analysed. The $CaCO_3$ content of the soil varies within very wide limits (e.g. 4–15%). The pH value for the top layer of soil varies within relatively small limits (6·94 for (3), and 7·81 for one stand of (2)). The humus content was 21·11% for (3); and for two stands each of the following: 20·08 and 18·96% (5); 17·07 and 13·79% (2); and 11·43 and 9·00% (1). Soil under (3) was the richest of all in P_2O_5 and K_2O, figures for the latter being 29·8 mg. K_2O/100 g. for (3), compared with 11·3 mg. for one stand of (2). No marked effect of stands on soil particle size could be detected.

2011. Pelišek, J. Meliorační význam dubu na půdách přesypových písků v oblasti západního Slovenska. **[The ameliorative value of Oak on the sand dunes of western Slovakia.]** *Lesn. Práce* 31 (4), 1952 (162–7, 170). [Cz.]

Presents the results of a soil investigation in the Šaštin-Malacky forest area (western Slovakia) in 1949. The parent material is sand (dune type) of 1–20 m. depth, 88–98% being SiO_2, 3–10% felspar, and 1–2% other minerals. The forest stands are mostly pure Pine, only rarely mixed with Oak or Lime. The area is at 190–240 m. altitude and somewhat undulating. The mean annual temperature is + 10° C., the January mean − 1·6°, and the July + 21·1°. Annual precipitation (including snow) is ca. 700 mm., the wettest months being May–July, and the driest January–February. The water-table is very low. Analysis of soil samples taken from sites at Šaštin carrying (1) an old Pine stand, (2) a young deformed Pine stand, and (3) an old Pine/Oak stand, shows that the soil profile under (3) contains more humus and the upper layers more plant nutrients than those under (1) and (2). Under pure Pine the soil is very poor and sometimes displays incipient iron-pan formation. Profiles are described for each site, down to 150–180 cm.

2012. Santos, N. Ferreira dos. **Notes on Portuguese mycorrhizae.** *Publ. Serv. flor. aqüic. Portugal* 18 (2), 1951 (97–109 + 4 plates). 8 refs. [E.]

A list of species with notes on associated mycorrhizae.

2013. Melin, E., and Nilsson, H. **Transfer of labelled nitrogen from glutamic acid to Pine seedlings through the mycelium of *Boletus variegatus* (Sw.) Fr.** *Nature, Lond.* 171 (4342), 1953 (134).

Cf. *For. Abstr.* 12 (No. 59).

2014. Miettinen, J. K., and Virtanen, A. I. **The free amino acids in the leaves, roots, and root nodules of the alder (*Alnus*).** *Physiol. Plant., Copenhagen* 5 (4), 1952 (540–57). 25 refs. [E.e.]

Cf. *For. Abstr.* 14 (No. 167).

2015. **[Root systems of some *Acacia* spp.]** *Rep. For. Dep. Sudan Jan. 1950–June 1951* [1952?] (41).

Root systems of some species of *Acacia* growing on a heavy clay soil were excavated in the Upper Nile Province. The following figures (in metres) were obtained for (*a*) depth, (*b*) maximum radius from stump: *A. arabica* (*a*) 8·8, (*b*) 3·1; *A. campylacantha* (*a*), 4·0, (*b*) 6·0; *A. seyal* (*a*) 7·9, (*b*) 9·0; *A. sieberiana* (*a*) 1·65, (*b*) 1·4.

181.4. Reaction to Biotic Influences (Competition etc.) and Fire

See also Nos. 2077–8, 2080, 2086, 2092–3, 2097, 2214.

2016. Hansen, H. L., and Bazukis, E. V. **Effects of deer and rabbits on Hazel brush at Itasca State Park.** *Minn. For. Notes* No. 10, 1952. pp. 2.

A study of Hazel brush inside and outside exclosures revealed no difference in the density or in the size of Hazel exposed to and protected from deer and rabbits.

2017. Wild, H. **The vegetation of Southern Rhodesian termitaria.** *Rhod. agric. J.* 49 (5), 1952 (280–92 + 1 plate). E.M.B.

Rhodesian termitaries carry a distinctive angiosperm flora. A list of species recorded is presented, with notes on their distribution in other habitats. Many of them are important constituents of woodland at lower altitudes, whereas at higher altitudes they are confined to termitaries and sometimes other specialized habitats, such as rocky kopjes or stream banks. Outstanding examples are species of the Capparidaceae. The termite-mound soils have a higher proportion of clays, N and basic minerals, such as Ca, Mg and K, and also a higher pH than normal soils between 4000 and 5000 ft. It is suggested that one of the factors contributing to the presence of lower-altitude species on termitaries at higher altitudes is that the low-veld species are favoured by soils with a rather alkaline reaction, and with a relatively high proportion of basic minerals. Such conditions are found at low altitudes in Southern Rhodesia, owing to the hotter and drier conditions and the comparative absence of leaching by heavy rains.

181.5. Reproductive Behaviour

See also Nos. 1935–6, 1939, 2101 *et seq.*

2018. Wright, J. W. **Pollen-dispersion studies: some practical applications.** *J. For.* 51 (2), 1953 (114–8). 14 refs.

The author summarizes his studies of pollen dispersal [cf. *For. Abstr.* 13 (No. 3688)] and discusses practical applications, e.g. in spacing of seed trees, prevention of contamination in seed orchards, and seed collection for breeding purposes.

2019. Allsop, F. **First production of fertile seed by the principal exotic conifers in New Zealand.** *For. Res. Notes N.Z. For. Serv.* 1 (4), 1951 (13–4).

Lists 17 species, showing the ages at which fertile seeds have been first observed.

2020. Pejoski, B. O broju semenki u plodovima *Juniperus excelsa*, Bieb. [**Number of seeds per fruit of *J. excelsa*.**] *Šum. List* 76 (10/11), 1952 (408–13). 13 refs. [Croat.croat.f.]

The number of seeds in fruits of *J. excelsa*, as determined statistically from 532 fruits taken from 3 sites, varied from 3 to 13 (arithmetic mean 6·59).

2021. Timofeev, G. P. O vlijanii èkologičeskih uslovii na urožaĭnostj i gruntovuju vshožestj semjan bereskleta borodavčatogo (*Evonymus verrucosa* Scop.). [**The influence of ecological conditions on the seed production and field germination of *E. verrucosus*.**] *Dokl. Akad. Nauk SSSR* 83 (4), 1952 (617–20). 6 refs. [Russ.] A.P.B.

Bushes that are (*a*) the progeny of several generations of life in the open, appear to seed more abundantly than those (*b*) grown under canopy for part or the whole of their life. In an open nursery (*a*) showed twice the field germination % after 2 years of (*b*). When sown under canopy there was little difference in germination % between the two categories and most of the germination occurred during the first year.

2022. [**Seed dispersal studies.**] *Rep. Nth. Rocky Mt. For. Range Exp. Sta.* 1952 (11–3).

First-year results showed that when reserve blocks of timber were left, both Larch and Douglas Fir seeds were scattered to a maximum distance of 10 chains from the closest timber edge, but that quantities were insignificant beyond 4 chains for Douglas Fir and 6 chains for Western Larch. Figures of sound seed/acre at different distances from the reserve block and as a % of figures within the block are tabulated. For Lodgepole Pine not more than 2000 sound seeds/acre, 6% of the number inside the reserve blocks, were distributed further than 1 chain from the block edge, and although some seed was found as far as 7 chains, it appears that dispersal beyond 4 chains is not reliable.

2023. Guttenberg, S. **Sweetgum seed is overrated flier.** *J. For.* 50 (11), 1952 (844).

Experiments were made in dropping seed of *Liquidambar styraciflua* from various heights up to 100 ft. at wind velocities of 5–25 m.p.h. Of the seeds that were trapped (on open prairie surrounding the tower) 96% were within 200 ft. of the tower and most of the remaining 4% fell between 200 and 600 ft.

2024. Bartels, H. Untersuchung über die Vitalität der Koniferenkeimlinge in Abhängigkeit vom Keimzeitpunkt. [**The vitality of conifer seedlings in relation to time of germination.**] *Z. Forstgenet.* 2 (2), 1953 (42–5). 2 refs. [G.g.]

Time of germination appears to have no direct correlation with seedling vigour in Spruce, Pine and Larch. Seeds germinating at different times, however, often show differences in weight. With Spruce the early germinating seeds are often the heaviest, the seedlings grow faster and reach greater heights before casting the seed-coat. With Pine the early germinating seeds are often the lighter and slower-growing. Larch seems to have the same tendencies as Pine, but this is difficult to ascertain from commercial seed because of damage frequently sustained during extraction.

2025. Rudolf, P. O., and Ralston, R. A. **Do age of mother trees and age of cones affect development of young Jack Pine?** *J. For.* 51 (2), 1953 (121–4). 5 refs.

The results of two tests of Jack Pine grown from seed produced by mother trees of different ages (ranging from under 10 to over 60 years) and one test of Jack Pine grown from seed from cones of different ages, showed no significant differences in progeny 10–14 years old. It appears to be safe,

therefore, to gather Jack Pine cones up to 5 years old from trees of any age so long as they are well developed and of good form.

2026. Goo, M. **[The location and speed of water entry into *Pinus thunbergii* seeds.]** *Bull. Tokyo Univ. For.* No. 41, 1951 (51–6). 10 refs. [Jap.e.]

A study was made during the first week in the germination bed on seeds coated with paraffin on different surfaces (illustrated) and to different degrees. The increase in weight, determined with a torsion balance, was regarded as water absorption. Water was absorbed as long as any part of the seed-coat was in contact with the water, and the rate of absorption was nearly proportional to the area in contact with the water. Curves showing the change in weight of seeds can be approximately represented by the equation $y = ax^b$, (x = time in minutes, y = increase in weight, and a and b can be read from tables) for the first 1–2 days when the first stage of absorption [cf. *For. Abstr.* 13 (No. 1049); 14 (Nos. 1935–6)] takes place. *From author's summary.*

2027. Wenger, K. F. **Effect of moisture supply and soil texture on the growth of Sweetgum and Pine seedlings.** *J. For.* 50 (11), 1952 (862–4). 9 refs.

A study was made of comparative development of 1-year-old potted seedlings of Pine (*P. taeda* and *P. echinata*) and Sweetgum (*Liquidambar styraciflua*) grown in soils of 3 different textures, and with 3 different levels of watering. Although Sweetgum seedlings produced more dry matter and developed larger root systems, the length of leader and branches was less than that of the Pines under all conditions of the experiment.

2028. Place, I. C. M. **Comparative growth of Spruce and Fir seedlings in sandflats.** *Silv. Leafl. For. Br. Can.* No. 64, 1952. pp. 4. 5 refs.

Seedlings of Balsam Fir and of Red, White, and Black Spruce grown in seedflats filled with sand were examined and measured. Fir had the advantage of Spruce in greater root elongation in the critical days immediately after germination. Spruce later makes better root development, but often too late to save the seedling. This difference has an obvious bearing on the competitive superiority of Fir. Of the Spruces, White was the most and Black the least aggressive.

2029. Dixon, A. C., and Place, I. C. M. **The influence of microtopography on the survival of Spruce and Fir reproduction.** *Silv. Leafl. For. Br. Can.* No. 68, 1952. pp. 4. 6 refs.

A study was made of the influence of small inequalities in the ground on survival of reproduction of *Picea rubens*, *P. mariana* and *Abies balsamea*, using depth of water-table as a datum for measuring elevation. Statistical analysis of the data indicated that survival under forest cover was significantly greater at the lower elevations (elevations varied from 6 in. to 2–3 ft.). Best growth occurred on the lower side slopes, not at the actual bottoms of the hollows. The same trend was noticeable in the open, but was of less importance.

181.6. Life Form, Habit. Post-Seedling Development and Form

See also Nos. 2196, 2232, 2238–9, 2530–2.

2030. Mudrich, H. Die Ausformung der Lärchenjugendkrone in Abhängigkeit von Boden und Veranlagung. **[The development of crown form in young Larch in relation to soil and hereditary factors.]** *Z. Forstgenet.* 2 (2), 1953 (32–41). 11 refs. [G.g.e.]

Data for the purpose of this study were collected from 13-year-old *Larix leptolepis* and *L. decidua* and hybrids of these two species on an experimental area in Gahrenberg forest district. Variations in crown form were studied ranging from the extremely broad to the extremely narrow. Within groups of trees having the same hereditary factors, a close correlation was observed between soil conditions and width of crown. Different sites produced different reactions according to the hereditary characteristics of the trees. In *L. leptolepis*, broad crowns predominate and the form is very uniform. In *L. decidua* narrow crows predominate and the form is very variable. The hybrids are intermediate, the length and arrangement of branches being influenced by *L. decidua*, their angle and curve and the form of the top by *L. leptolepis*. Variations in crown form can result from the varying dominance of the parent trees.

2031. Hausendorff, E. Die Schirmkiefer bei Mölln: eine ungewöhnliche Störung der Höhenwuchstendenz und des Verzweigungssystems von *Pinus silvestris* L. **[The 'umbrella' Pine near Mölln [Holstein]: an unusual disturbance in the height growth and branch system of *P. sylvestris*.]** *Mitt. dtsch. dendrol. Ges.* (*Jb. 1951/52*) No. 57, [1952?] (81–102, 105). 14 refs. [G.e.]

Gives what is known of the history of these trees, and discusses their peculiar crown structure (resulting in a roughly hemispherical rather than a true 'umbrella' form) and possible genetic status, with some concluding philosophical reflections on plant form and its physiological and genetic basis.

2032. Venema, H. J. Een treurvorm van *Castanea sativa* Mill. **[A pendulous form of *C. sativa*.]** *Jaarb. ned. dendrol. Ver. 1950–51* 18, [1952?] (87–8). 1 ref. [Du.e.]

Notes the occurrence of a group of pendulous *C. sativa*, of seedling origin and probably from a single mother tree, in a wood at Leersum, near Utrecht. The tips of the lowest branches meet the soil and take root. This form appears to be unknown to dendrological literature, except for a Japanese paper reporting its occurrence near Ono and Yohazawa.

2033. Vyskot, M. Význam pěstění korun pro výchovu jakostních dubů. (Studium problému výstřelků u dubů). **[The importance of crown-tending for the growing of high-quality Oak. (Study on the problem of epicormics).]** *Sborn. čsl. Akad. zeměd.* 24 (1/2), 1951 (108–28). 19 refs. [Cz.russ.e.] C.G.B.

Presents the results of a study of 505 Oak trees in coppice and high forest in a hilly district of Bohemia. The relationship between the degree of epicormic growth and the crown dimensions was studied, using statistical methods. It was found that the number

of epicormics decreases as the crown dimensions become more and more commensurable with the d.b.h. and height of the tree, the degree of crown compression being particularly important.

181.7. Duration, Longevity, Stature; Records of Exceptional Age or Size. Effects of Age on Behaviour

See also No. 2025.

2034. Areses Vidal, R. El tejo de Puentedeume (La Coruña). **[The Puentedeume Yew (Corunna).]** *Montes, Madrid* 8 (47), 1952 (313–21). [Span.]

Description of a famous Yew of great size, with notes on *Taxus baccata* in general (etymology, countries of origin, distribution in Spain and historical associations), and accounts of some other famous Yews.

2035. Bogdanov, P. L. Belyĭ topolj-velikan. **[A giant *Populus alba* tree.]** *Priroda, Moskva* 41 (5), 1952 (117). [Russ.] A.P.B.

Illustrated description of a White Poplar tree 35 m. high and 4·2 m. in d.b.h., probably 120–140 years old, growing in the valley of the river Khosta, on the Black-Sea coast of the Caucasus. The tree seems to have coalesced from 3 lateral shoots following the destruction of the leader.

181.8. Phenology

See also Nos. 1873, 1929–33, 1953, 2006, 2009, 2046, 2532, 2602.

2036. Rohmeder, E. Der jahreszeitliche Verlauf des Höhenwachstums früh- und spättreibender Fichten. **[Seasonal course of height growth in early- and late-flushing varieties of Spruce.]** *Forstwiss. Cbl.* 71 (11/12), 1952 (368–72). [G.g.]

Height growth was measured in plots containing (1) late-flushing, and (2) early-flushing varieties of Spruce, from the beginning of the growing season until 8 August. The average period of growth is roughly the same in each variety, the late-flushing trees growing on after the early-flushing ones. The average period of growth was 6–7 weeks, though it varied widely in different individuals, in some lasting 4, and in others 10 weeks. In general, the greater the growth, the longer was the period of growth. Within an 11-day observation period from the end of June until the beginning of July, daily growth averaged 9 mm., though in some individuals a growth of 15 mm. was attained. It is possible, therefore, to select late flushing and fast growing strains for sites where the climate allows only a short growth period.

2037. Fahn, A. **Development of annual rings in a number of indigenous forest trees in Israel.** *La-Yaaran* 2 (3), 1952 (60–8, 85). [Heb.e.]

Investigations were made during 1950–51 on the development of annual rings of the following trees, forming a typical ecological and phytosociological unit: *Quercus ithaburensis, Pistacia atlantica, P. palaestina, Crataegus azarolus, Quercus calliprinos* and *Ceratonia siliqua*. The construction of the annual ring, its process of development, its breadth and its relation to the phenology of the tree are described for each species and tabulated data are given for *Q. ithaburensis* and *Ceratonia siliqua*. The following conclusions are drawn: (1) Cambial activity in *Ceratonia siliqua* starts in the middle of April and in the other 5 species at the end of March. (2) The cambium remains active until the end of August for *Crataegus azarolus*, the *Quercus* spp. and *P. palaestina*, early October for *P. atlantica*, and mid-February for *Ceratonia siliqua*. (3) Neither temperature nor lack of summer rainfall is a determining factor in the development of the annual ring, but both induce early cambial activity. (4) In the deciduous species *Q. ithaburensis, Crataegus* and the *Pistacia* spp., leaf-bud activity begins before cambial activity, while in the evergreen species *Q. calliprinos* and *Ceratonia siliqua* cambial activity begins together with that of the flower buds and slightly later than that of the leaf buds. (5) Generally cambium division in stems and branches begins together. (6) There is little if any difference in time between the beginning of cambial activity on the southern and northern side of the stem. (7) Increase in the ring width take place from above downwards and the ring is wider at the northern side of the stem. *From author's summary.*

182. *Synecology, Plant Sociology: General, Principles and Methods*

2038. Aichinger, E. Erklärung der wichtigsten Fachausdrücke aus dem Gebiete der Pflanzensoziologie. **[Explanation of the most important technical terms used in plant sociology.]** *Angew. PflSoziol.* No. 1, 1951 (171–86). [G.]

An expanded version of the glossary noted in a previous paper. [See *For. Abstr.* 14 (No. 2047).]

182.1. Palaeoecology. History of Vegetation

2039. Pearsall, W. H. **Habitat, vegetation and man.** *Nature, Lond.* 171 (4348), 1953 (367–8).

Summary of a lecture. Discusses evidence of extensive deforestation derived from pollen analysis and analysis of mud cores from lakes showing soil changes, illustrated by examples from the Breckland and the English Lake District. The possibility of this deforestation being partly due to climatic changes is discussed.

2040. Špoljarić, Z. Anatomska i polenanalitska istraživanja nekih lignita iz sjeverne Hrvatske. **[Anatomic and pollen-analytic investigations on some lignites from northern Croatia.]** Jugoslovenska Akademija Znanosti i Umjetnosti, Zagreb. 1952. pp. [98] + 19 photos. 63 refs. [Croat.croat.e.]

Histological examination of wood remains from the alluvial and diluvial layers, and of the lower Pliocene lignites, from lignite deposits at Ivanec, have revealed the following genera and species: *Quercus*, with species belonging to the *Leucobalanus* and *Erythrobalanus* groups; *Ulmus campestris, U. montana*; thick rhytidome of the genera *Quercus* and *Ulmus*; remains of *Pinus sylvestris* and *Salix*. A gradual deterioration of climate towards the deeper layers is inferred. The Pliocene lignite consists almost exclusively of *Taxodioxylon* wood, while samples with advanced decomposition show the characteristics of *Cupressinoxylon*. Pollen analyses

revealed 11 genera of Coniferae, 17 genera of broad-leaved trees and shrubs, and 5 genera of herbs and water plants. In pollen spectra, pollens of *Sequoia*, *Taxodium*, and *Larix* are the most frequent, with *Pinus* as runner-up, while *Tilia* is the most frequent among hardwoods. The abridged translation in English covers 30 pages.

2041. Li, H.-L. **Floristic relations between eastern Asia and eastern North America.** *Transactions of the American Philosophical Society, Philadelphia (n.s.)* 42 (2), 1952 (371–429). 194 refs. L.S.

The present isolated and disjunct floras of eastern Asia and eastern North America appear to be the remnants of a great mesophytic forest that extended over all the northern hemisphere and reached the arctic regions in the Tertiary. Some genera, such as *Cercis* and *Liquidambar*, apparently belong to the same category but survive also in southern Europe and western Asia. The use of the term 'tertiaro-mesophytic' is suggested for these floristic elements. *From author's summary.*

182.2. Succession, Alternation and Periodicity in Vegetation

See also Nos. 2047–8, 2050–3, 2059, 2077–8, 2086, 2097–8, 2503.

2042. Persoglio, I. Razvoj rastlinstva na kopiščih. **[Development of ground vegetation on charcoal-burning sites.]** *Gozd. Vestn.* 10 (4), 1952 (97–101). 4 refs. [Sloven.]

Results of a floristic investigation of 7 charcoal sites of different age, made in 1949 on the southern slope of the Snežnik range (1100–1250 m. alt.) are given in a table. Species are divided into 3 major groups and the author claims that it is possible to determine the age of the charcoal sites from their vegetation. The pioneer species (moss, *Minuartia*, *Rumex*) are followed by Leguminosae (e.g., *Trifolium* spp.). Only in the latest stages does the soil tend to become acid, with corresponding changes and additions of species. The author recommends conducting large-scale investigations on the natural succession on charcoal-burning sites.

2043. Keever, C. **Present composition of some stands of the former Oak/Chestnut forest in the southern Blue Ridge Mountains [N. Carolina].** *Ecology* 34 (1), 1953 (44–54). 7 refs.

The rapid spread of *Endothia parasitica* disease is destroying *Castanea dentata* in this region. It is too soon to say what the new climax will be, but indications are that the former Oak/Chestnut type will be replaced by Oak/Hickory.

182.3. Units of Vegetation (Associations etc.)

See also Nos. 2047–9.

2044. Karpiński, J. J. Zagadnienie biocenozy w gospodarce leśnej. **[The question of the biocoenosis in forest management.]** *Sylwan* 94 (1), 1950 (3–14). [Pol.russ.e.]

A short exposition of the nature of the biocoenosis, which the author conceives as a multiform, 'open', dynamic, and potentially continuous system. Research and management alike should, he considers, be based, not on the stand or forest type but on the natural foundation of the biocoenosis and its ecological succession, in which the biotype constitutes a basic element. He deprecates the conception of 'harmony' in a biocoenosis, which is characterized rather by mutual influence or struggle.

182.4. Layer Communities

See Nos. 1890, 2347–8.

182.5. Synecological Measurements and Methods

2045. Christian, C. S., and Perry, R. A. **The systematic description of plant communities by the use of symbols.** *J. Ecol.* 41 (1), 1953 (100–5 + 4 photos).

A field method for the rapid and systematic description of plant communities in respect of appearance, structure, height, density, and floristic composition is described. A formula of letters and figures is built up from symbols representing the storeys, their component layers, and the density and height of each in the community. Floristic composition is shown by lists of abbreviated species names.

2046. Wilson, H. L., and Berard, E. V. **Autumn colours, an aid to wildlife cover mapping.** *J. Wildlife Mgmt.* 17 (1), 1953 (98–9). B.A.P.

Colour of autumn foliage is a useful means of identifying forest types from adequate vantage points. A chart is presented stating the colours of the autumn foliage of certain North American hardwoods.

187. *Vegetation Types*

See also Nos. 1871–2, 1874, 1968, 1997, 2017, 2503

2047. Aichinger, E. Grundzüge der forstlichen Vegetationskunde. **[Outlines of forest plant sociology.]** *Berichte der Forstwirtschaftlichen Arbeitsgemeinschaft an der Hochschule für Bodenkultur, Vienna* Spec. No., 1949. pp. 200. 97 refs. [G.]

An exposition, condensed from a larger work in preparation, of the author's classification system for the vegetation types of the Alpine region of Europe. In contrast to Braun-Blanquet's system, it is not based primarily on differential and characteristic species but on physiognomy and site conditions, and great emphasis is laid on succession and its practical importance to the forester. The framework of the classification is displayed in a table of 5 physiognomic classes (sward communities; high perennial herbs; suffrutices; scrub or low forest; and forest), subdivided by 6 site groups (basic soils; acid soils; floodland; lower slopes receiving supplementary water by drainage from above; marsh or fen; and bog), and floristic features. German and Latin names are given to each of the 100 groups thus distinguished, e.g. 'bodensaurer Stieleichenwald' (*QUERCETUM roboris acidiferens*). Successional tendencies are indicated by arrows (→ for progression and ← for regression, with additional signs for the cause of regression where known), e.g. *Laricetum deciduae basiferens* → *PICEETUM excelsae* ← *Fagetum* denotes a Spruce forest, derived by succession

from Larch forest on a basic site, which has been succeeded by Beech but later set back to the Spruce stage by human intervention. The unit of classification is not an 'association'—a term avoided altogether—but a 'vegetation development type' ['Vegetationsentwicklungstyp'], defined as comprising all plant communities that are uniform in physiognomy, floristic and sociological characters and effective site factors, and which belong to the same stage of a successional series. For purely man-made forest the term *Forst* is used (instead of *Wald*) and no Latin name is given, e.g. a Spruce plantation diagnosed as being on a basic Beech site derived by progression from Oak/Hornbeam, is denoted as 'Fichtenforst' = (*Querceto-Carpinetum* → *FAGETUM basiferens*).

These principles are set forth in a general introduction which is followed by a summary of the types recognized and by notes on the individual types, with diagrams showing their probable successional relationships. A short glossary is appended of the special terms used by the author, together with some others that are necessary for comparison of the author's system with others. [Cf. *For. Abstr.* 14 (No. 2038).]

2048. AICHINGER, E. Vegetationsentwicklungstypen als Grundlage unserer land- und forstwirtschaftlichen Arbeit. **[Vegetation development types as a basis for Austrian agricultural and forestry work.]** *Angew. PflSoziol.* No. 1, 1951 (17–20). 6 refs. [G.]

Briefly recapitulates the principles of the author's classification of vegetation types [see preceding abstract], making a small modification in the symbols used—the direction of succession being indicated by oblique arrows (upward for progression, downward for regression), e.g. *PICEETUM excelsae vacciniosum myrtilli* ↗ *Fagetum*; *Abieteto-Fagetum piceetosum* ↘ *PICEETUM excelsae vacciniosum myrtilli*.

2049. AICHINGER, E. Soziationen, Assoziationen und Waldentwicklungstypen: eine vergleichende Studie. **[Sociations, associations and forest development types: a comparative study.]** *Angew. PflSoziol.* No. 1, 1951 (21–68). 14 refs. [G.]

Quotes extensively from Braun-Blanquet to clarify the difference between his and the author's approach to the classification of vegetation types; discusses difficulties in applying Braun-Blanquet's system to the practical problems of management, especially the inadequacy of 'characteristic species' for the classification of vegetation which is and must continue to be modified by man's activities; and illustrates the theme by a tabular comparison and discussion of the results of classifying the vegetation of 20 localities by the two systems, showing that a single Braun-Blanquet association may represent several different 'vegetation development types' (8 in the example given).

2050. AICHINGER, E. Vegetationskundlicher Kurs im Böhmerwald. Vegetationskundlicher Kurs im Schloss Tollet. **[Courses for the study of vegetation in the Böhmerwald and Schloss Tollet [Upper Austria].]** *Angew. PflSoziol.* No. 1, 1951 (115–58; 159–68). [G.]

Two papers, reporting on the vegetation types encountered and their interpretation according to the author's system of classification.

2051. AICHINGER, E. Die Rotbuchenwälder als Waldentwicklungstyp. **[Beech forests as a 'forest development type'.]** *Angew. PflSoziol.* No. 5, 1952. pp. 106. [G.] Price [11*s.* 6*d.*]

The first in a series of monographic studies of Austrian forest types, treated as 'forest development types' according to the author's system [see preceding abstracts]. Each study deals with some major group of types, with subtypes and successionally related stages, e.g. the present work covers not only pure Beech or forest in which Beech predominates but also all 'development types' that lead to Beech, together with degradation stages. The treatment, in systematic order, is by example: each actual unit of vegetation is described from nature, the author giving first a general description of the community and its floristic composition; then its interpretation under his scheme of classification, with discussion of its place in succession; and finally his conclusions regarding its silvicultural treatment.

2052. AICHINGER, E. Rotföhrenwälder als Waldentwicklungstyp. **[Scots Pine forests as a 'forest development type'.]** *Angew. PflSoziol.* No. 6, 1952. pp. 68. [G.] Price [9*s.* 0*d.*]

A study on the same general lines as that on Beech [see preceding abstract].

2053. AICHINGER, E. Fichtenwälder und Fichtenforste als Waldentwicklungstypen. **[Norway Spruce forests and plantations as 'forest development types'.]** *Angew. PflSoziol.* No. 7, 1952. pp. 179. [G.] Price [£1. 0*s.* 6*d.*]

[See preceding abstracts.] Besides natural and semi-natural forests of the Spruce region, the present work includes a section on pure Spruce plantations outside that region, with discussion of measures for their conversion based on the ecological findings.

2054. WENDELBERGER, G. Das vegetationskundliche System Erwin Aichingers und seine Stellung im pflanzensoziologischen Lehrgebäude Braun-Blanquets. **[Aichinger's system of classifying vegetation, and its position in the theoretical structure of plant sociology as developed by Braun Blanquet.]** *Angew. PflSoziol.* No. 1, 1951 (69–92). 10 refs. [G.]

A detailed examination of the differences in basis and the theoretical relationship of the two systems.

2055. BARTSCH, J., and BARTSCH, M. Der Schluchtwald und der Bach-Eschenwald. **[Ravine forest (*Acereto-Fraxinetum*) and Ash valley forest (*Cariceto remotae-Fraxinetum*). [Edited and with introduction by E. Aichinger.]]** *Angew. PflSoziol.* No. 8, 1952. pp. 111. 96 + 54 refs. [G.e.f.] Price [12*s.* 0*d.*]

A comprehensive and critical review of literature, completed by the authors in 1945 and published posthumously with very little alteration. The two communities are considered separately, under a standard order of sub-heads, viz.: nomenclature, with Latin and German synonymy (particularly important for the *Acereto-Fraxinetum*, the nomenclature of which has been confused and misleading);

floristic and sociological structure; subdivisions; habitat and site factors; distribution and phytogeographical position; systematic classification; and relation to allied communities. This general review is followed, in both parts, by abstracts in chronological order—making up the bulk of the work—and a formal bibliography in alphabetical order. A common index is also provided to authors quoted in any section.

2056. Lüdi, W. [Editor]. Die Pflanzenwelt Irlands: Ergebnisse der 9. Internationalen Pflanzengeographischen Exkursion durch Irland 1949. **[The flora and vegetation of Ireland: results of the 9th International Phytogeographical Excursion, Ireland, 1949.]** *Veröff. geobot. Inst. Rübel* No. 25, 1952. pp. 421 + 7 folding tables in pocket. Many refs.

A collection of papers, in English and German, by various participants, including 'Irische Pflanzengesellschaften' (*J. Braun-Blanquet* and *R. Tüxen*, pp. 224–415)—a comprehensive review of Irish plant communities classified by the senior author's system.

2057. Scurfield, G. **Ecological observations in southern Pennine woodlands.** *J. Ecol.* 41 (1), 1953 (1–12 + 2 photos, 3 dgms., 1 map). 13 refs.

The abundance of *Deschampsia flexuosa* in the several Oak woods studied may be taken as an indication of their edaphic relationship.

2058. Macko, S. Zespoły roślinne w Karkonoszach, część I. Karkonosze wschodnie. **[Plant communities in the Karkonosze mountains [Riesengebirge]. Part I. Eastern Karkonosze.]** *Acta Soc. Bot. Polon.* 21 (4), 1952 (591–683 + 1 map). 65 refs. [Pol.pol.g.] C.G.B.

Up to the upper forest limit of ca. 1250 m., the main association is *Piceetum excelsae*. Still higher, covering the mountains to their summits, there are a number of associations of herbs and grasses, or the association *Pinetum mughi sudeticum*. In general, the associations above the upper limit of forests closely resemble those in the Carpathians and granite Tatra Mountains.

2059. Westhoff, V. Gezelschappen met houtige gewassen in de duinen en langs de binnenduinrand. **[Plant communities with woody species in the dune country [of Holland] and along its inner margin.]** *Jaarb. ned. dendrol. Ver. 1950–51* 18, [1952?] (9–49 + 8 photos). 85 refs. [Du.e.]

Discusses the habitats afforded by the dune country with special reference to $CaCO_3$ content; relief, shelter and ground water; and age and degree of leaching of dunes. Gives notes on successions, and recognizes ca. 50 plant communities—some described for the first time—varying from dwarf shrubs to Oak/Maple woodland.

2060. Roisin, P., and Thill, A. Aperçu de la végétation forestière de quelques bois de la région sablo-limoneuse. **[The forest vegetation of the sandy-loam region [of Belgium].]** *Bull. Soc. for. Belg.* 59 (12), 1952 (513–37 + 4 photos); 60 (1), 1953 (1–32 + 1 dgm.). 12 refs. [F.]

A detailed ecological study with some discussion of the silvicultural implications.

2061. Tomašević, Đ. Pregled fitocenoza Grdeličke Klisure. **[On the phytocoenoses of the Grdelička Klisura.]** *God. Zborn. zemj.-šum. Univ. Skopje* No. 3, 1951 (205–46 + 1 tbl. + 1 map). 27 refs. [Croat.croat.g.]

The Grdelička Klisura is a narrow valley, 29·5 km. long, south of Niš, in the valley of the Southern Morava at 255–325 m. altitude. Its vegetation can be divided into: *Fagus moesiaca* forest, *Quercus sessiliflora* forests, *Quercus conferta/Quercus cerris* forests, *Carpinus orientalis* forests, derivative scrub, and grassland; in addition small areas of *Populus tremula* occur and some plantations of *Robinia pseudoacacia*. Detailed descriptions of all these communities are given.

2062. Gajić, M. O vegetaciji Košutnjaka. **[Vegetation of Košutnjak.]** *Glasn. šum. Fak., Beograd* No. 5, 1952 (283–308). 17 refs. [Serb.f.]

Describes 6 plant communities of Košutnjak, and gives data relating to the soil pH and microclimate of the area.

2063. Bunuševac, T. Geološka podloga i rasprostranjenje šumskih asocijacija na oglednom dobru Majdanpečka Domena i njegovoj neposrednoj okolini. **[Geological basis and distribution of forest associations on the experimental area of the Majdanpek Estate and in the immediate vicinity.]** *Glasn. šum. Fak., Beograd* No. 3, 1951 (1–23). 4 refs. [Serb.f.]

The author's investigations have shown that: (1) *Fagetum montanum serbicum* is found over a bedrock of andesite, limestone, crystalline slates (gneiss, mica-slate, amphibolite), and palaeozoic schist; (2) *Quercetum montanum serbicum* over andesite, liassic gravel and conglomerates, limestone, and crystalline schists; (3) *Querceto-Carpinetum* over andesite, liassic gravel and conglomerates, and crystalline schists; (4) *Acereto-Fraxinetum* over limestone, crystalline schists and palaeozoic schists; (5) *Acer monspessulanum/Fraxinus ornus* over limestone, and the subassociation *Fagus moesiaca/Vaccinium myrtillus* over liassic gravel and conglomerates, and over crystalline schists. Thus apart from (5) the boundaries of associations never coincide with those of bedrock types. It is significant that the only coincidence found occurs on a very steep slope (70–85%), so that it may be due to the combined effect of bedrock and relief. [Cf. *For. Abstr.* 13 (No. 1061).]

2064. Antić, M., and Bunuševac, T. Hemiska reakcija zemljišta u šumskim asocijacijama Majdanpečke domene. **[Chemical soil reaction in forest associations of the Majdanpek Estate.]** *Glasn. šum. Fak., Beograd* No. 5, 1952 (75–104 + 1 photo). 11 refs. [Serb.f.]

The extreme values of pH in the Majdanpek Estate are as follows: *Fagetum montanum serbicum*, 5·14–6·91; *Quercetum montanum serbicum*, 4·68–6·24; *Querceto-carpinetum serbicum*, 6·16–6·29; *Acereto-fraxinetum*, 5·44–6·45; and *Fagetum montanum muscosum*, 4·33–5·30. Values are also given for soils on the following parent materials: limestone, 5·44–6·72; andesite, 5·75–6·23; mica schists, 4·73–5·98; gneiss, 4·10–5·37; amphibolite, 5·30–6·91; and lias-gravel conglomerate, 4·32–5·16. The pH value always decreases with increasing depth in the area examined. The high pH value in the top layer

under *Acereto-fraxinetum* is due to the large Ca content in the foliage of Sycamore and Ash; the acidity of the *Fagetum montanum muscosum* is due to the acidifying effect of the remnants of *Vaccinium myrtillus* and of the mosses *Dicranum*, *Leucobryum*, and *Polytrichum*.

2065. Petračić, A., and Anić, M. Obični jasen (*Fraxinus excelsior* L.) u Zagrebačkoj gori. [**F. excelsior on the Zagreb mountain.**] *Glasn. šumske Pokuse* No. 10, 1952 (25–62 + 5 photos + 1 map). 14 refs. [Croat.croat.f.]

The range of Ash, which is indigenous on the Medvednica (Zagreb mountain), is predominantly 800–1035 m. alt., the lower boundary descending sometimes to 400 m. (in valleys with a N. aspect). It occurs within the Beech and Fir forests, growing abundantly on sites with high air humidity and good illumination, and predominating in mild valleys and on plateaux with much accumulation of winter snow and with fresh, humous, rather deep soil, over green schists. Irregular fellings, grazing, and fires have contributed to the considerable increase in the proportion of Ash in the original Beech and Fir stands on the S. slopes. The Ash stands on the mountain have admixtures of *Acer platanoides*, *A. pseudoplatanus*, *Ulmus montana*, *Fagus sylvatica*, and *Abies alba*. Their structure and the composition of the *Fraxineto-Aceretum* are tabulated.

2066. Tutin, T. G. **The vegetation of the Azores.** *J. Ecol.* 41 (1), 1953 (53–61). 10 refs.

Includes a description of the 'Laurel forest', dominated by the endemic broadleaved species *Persea azorica*.

2067. Yoshioka, K. [**Forest communities in the environs of Sendai, N. Honshu.**] *Bot. Mag., Tokyo* 63 (741/742), 1950 (36). [Jap.] I.M.I.

2068. Yatoh, K. [**Ecological studies on the forest vegetation of Ohsugidani National Forest, Honshu.**] *Bot. Mag., Tokyo* 63 (741/742), 1950 (33–4). [Jap.] I.M.I.

A brief description of the virgin forest portion (2200 ha. out of 5800), which the author divides into 3 zones, subtropical, warm temperate and cold temperate.

2069. Kurauti, I. [**Ecological studies of Bamboo forests.**] *Bot. Mag., Tokyo* 63 (741/742), 1950 (38). [Jap.] I.M.I.

In central Honshu, along the Pacific Coast.

2070. Maeda, T., and Yoshioka, J. [**Studies on the vegetation of Chichibu mountain forest (II). The plant communities of the temperate montane zones.**] *Bull. Tokyo Univ. For.* No. 42, 1952 (129–50 + 2 tbls. + 6 photos). 1 ref. [Jap.e.]

Cf. *For. Abstr.* 13 (No. 1065).

2071. Suzuki, T. [**The warm temperate forest vegetation of the Oosumi peninsula.**] *Bull. Tokyo Univ. For.* No. 41, 1951 (57–73). [Jap.e.]

Recognizes and describes 3 plant associations, relating them to climate and geological formation.

2072. **Types and distribution of forests in Thailand.** Royal Forest Department, Thailand. 1950. pp. 10 + map. [E.]

2073. Krishnaswamy, V. S., and Gupta, R. S. **Rajputana desert—its vegetation and its soil.** *Indian For.* 78 (12), 1952 (595–601). 4 refs.

A very brief indication of vegetation and a preliminary account of the soils, including salt content, N, pH and clay %.

2074. Vidal-Hall, M. P. **The sylviculture and regeneration of the forest types of the Equatoria and Bahr el Ghazal provinces.** *Memoirs of Forestry Division, Ministry of Agriculture, Sudan* No. 4, 1952. pp. 19. Price *Pias.* 8 (1*s.* 6*d.*)

The 5 main vegetation types in the two provinces (mountain high forest; plains high forest; closed savanna; open savanna; floodplain grassland) are described, and the usual methods of encouraging natural, and establishing artificial regeneration are described and discussed. There is also a note on the Bamboo (*Oxytenanthera abyssinica*) forest which is widely distributed but does not fit into the above classification.

2075. Taylor, C. J. **The vegetation zones of the Gold Coast.** *Bull. For. Dep. Gold Cst.* No. 4, 1952. pp. 12 + map. Price 2*s.* 6*d.*

2076. Story, R. **A botanical survey of the Keiskammahoek District.** *Mem. bot. Surv. S. Afr.* No. 27, 1952. pp. 184 + 85 photos + 1 map + 5 gphs. Numerous refs.

The study begins with a review of the topography, geology, soils and climate of the area, and continues with detailed studies of different types of woodland and grassland. A chapter is devoted to the relationship of grassland to woodland, and another to economic aspects such as land use, grazing and plants of economic importance.

2077. **Ecological studies: West coast of Vancouver Island.** *Rep. B.C. For. Serv. 1951*, 1952 (39–44).

As a result of detailed studies, the numerous forest associations of this area are divided into two main groups: (*a*) those which can maintain themselves only if a denuding factor (principally fire) recurs every 300–500 years, and (*b*) those that can maintain themselves in the long-continued absence of denuding factors. The general predominance of Hemlock over Douglas Fir in this area, usually attributed to climatic factors, is considered to be largely due to the absence of fires on the west coast, which receives a much heavier rainfall than the east coast. Abundance of Douglas Fir could probably be increased by the use of clear-cutting instead of fires in maintaining a favourable ecological environment.

2078. **Lodgepole Pine (*Pinus contorta* Dougl. variety *latifolia* Engelm.) study in the central interior [of British Columbia].** *Rep. B.C. For. Serv. 1951*, 1952 (46–8).

It is considered that pure stands of Lodgepole Pine are a fire climax. In the absence of fire it can maintain itself only on poor, dry sites; elsewhere it

gives place to Spruce (mainly *Picea glauca*) and Fir (*Abies lasiocarpa*).

2079. HANSON, H. C. **Vegetation types in northwestern Alaska and comparisons with communities in other arctic regions.** *Ecology* 34 (1), 1953 (111–40). 31 refs.

A preliminary classification of the vegetation in N.W. Alaska is presented. The types occupying the largest land areas are the cottongrass/sedge/dwarf shrub/heath complex, sedge marshes, alpine *Dryas*, dwarf shrub, Willow shrub, Birch shrub, and White Spruce/shrubs. Suitable conditions for good growth of lichens, furnishing winter pasture for reindeer, occur in many of these types and the classification has been found useful in making aerial surveys of lichen range suitable for winter grazing. The various types are also valuable in indicating soil conditions such as depth to permafrost, kind of surface and subsurface materials, soil moisture, and drainage, and therefore for surveys made for locating roads, camp sites, landing grounds etc. *From author's summary.*

2080. KURZ, H., and WAGNER, K. A. **Factors in Cypress dome development.** *Ecology* 34 (1), 1953 (157–64).

The characteristic dome formation of *Taxodium distichum* stands in Florida is due to periodic burning which causes stunted growth, or repeated coppicing on the edge of the stand. During droughts the periphery of the swamp is the first part to become dry, and this also retards the growth of the trees on the edge.

2081. BURGES, A., and JOHNSTON, R. D. **The structure of a New South Wales subtropical rain forest.** *J. Ecol.* 41 (1), 1953 (72–83 + 4 photos). 3 refs.

An area of marginal type, dominated by *Ceratopetalum apetalum*, was examined by clear-felling a 10-ft. transect, measuring the individual trees and shrubs and charting lesser growth.

2. SILVICULTURE

2082. WOHLFARTH, E. Zur waldbaulichen Lage der Gegenwart: Sammelreferat. **[The present position in [German] silviculture: a review of literature.]** *Forstarchiv* 23 (4), 1952 (57–65). 53 refs. [G.]

Summarizes in general terms some recent views expressed in literature on technical silvicultural problems (reforestation of clear fellings; tending; conversion of pure conifer stands; regeneration; care of the soil and the forest microclimate), and attempts to clarify some questions of terminology arising from the changing ideas in German forestry (e.g. *Betriebszieltyp* vs. *Zielwaldtyp*; *Waldbau* vs. *Waldpflege*).

2083. KAMIMURA, T. **[The silviculture of Kumasugi, a variety of *Cryptomeria japonica* in Nagano Prefecture.]** *For. [industr.] Econ., Tokyo* 5 (11), 1952 (23–9). [Jap.]

2084. **Symposium on Southern Silviculture.** *J. For.* 51 (2), 1953 (88–97).

Includes the following papers, the first two in full and the others summarized: The case for even-aged management of Southern Pine (*R. D. McCulley*); The case for all-aged management of Southern Pines (*W. E. Bond*); Silviculture of Southern Pines from the standpoint of integrated utilization of products (*G. A. Anderson*); Silviculture of Southern Pines from the standpoint of growing sawlogs (*T. R. Moberg*); Comments on Southern Pine silviculture (*R. H. Westveld*).

2085. GUINIER, [P.] La question du noyer. **[Walnut.]** *C.R. Acad. Agric. France* 39 (15), 1952 (587–91). [F.] A.P.B.

Includes notes on factors to be taken into account when growing Walnut for timber.

2086. **Overcoming the threat to Aspen.** *Paper Tr. J.* 135 (1), 1952 (14). P.R.

A brief discussion of research into the protection of Aspen stands in Michigan from invasion by Maple and other hardwoods on good soil, and by Oak on poorer soil.

22. SILVICULTURAL SYSTEMS, CONSTITUTION AND COMPOSITION OF STANDS; FORMS OF STAND

See also No. 1920.

221. *High Forest Systems*

See also Nos. 1902, 2091, 2224, 2252, 2539, 2542, 2549, 2553, 2658.

2087. CROSSLEY, D. I. **Some observations on Lodgepole Pine regeneration after clear cutting in strips.** *Silv. Leafl. For. Br. Can.* No. 65, 1952. pp. 3.

On a poor site, where competing vegetation was sparse, clear felling of alternate strips resulted in ample reproduction of Lodgepole Pine.

2088. ZASADA, Z. A. **Reproduction on cut-over swamplands in the upper peninsula of Michigan.** *Sta. Pap. Lake St. For. Exp. Sta.* No. 27, 1952. pp. 15. 5 refs.

A survey of recent swamp fellings showed that full stocking takes place under present felling practices (selective, diameter-limit or clear felling) except on clear-felled peat soils. The composition of the new stands, however, is shown in tables to be less desirable, as they contain a larger proportion of hardwoods on all soil types. The proportion of *Thuja occidentalis* has dropped on the 'muck' and wet mineral soils where it grows best, and reproduction of *Picea mariana* is poor on peat soils where it was the main species. *Abies balsamea* is reproducing vigorously on all types. *Populus tremuloides* is invading the swamps only on the wet mineral soils. Conifers regenerate more satisfactorily on partially, than on clear-felled sites. Studies are needed to show how these stands can be harvested without reducing the proportion of Spruce and *Thuja occidentalis*.

2089. Wahlenberg, W. G. **How to harvest: effects of cutting methods in growing Appalachian hardwoods.** *Sth. Lumberm.* 185 (2321), 1952 (175–8).

Four adjacent plots of over-mature, defective growth, 6·2 to 11·4 acres in area, were treated in 1930, being clear felled, felled to a diameter limit of ca. 14 in., selection felled (retaining desirable species and stems of all sizes and removing undesirable trees regardless of size) or left as control. Tables and graphs are given showing timber and cordwood found, felled and left, volume growth after 20 years, distribution by species groups, effect on stand composition, and value of 20 years' growth and yield. The selection method gave a sawlog volume growth of 2275 bd. ft. (2268 in desirable species) over the 20 years, plus 3·1 cords of other wood. The diameter-limit method gave 1422 bd. ft. of sawtimber plus 6·3 cords of other wood. The clear-felled plot showed the most growth (56 cu. ft./acre/year), but all but 80 bd. ft. was too small for sawlogs. Annual value increment averaged $1·62 for selection felling, $0·48 for the control plot and $0·38 for the clear-felled plot.

2090. Ammon, W. Das Plenterprinzip in der Waldwirtschaft: Folgerungen aus 40 Jahren schweizerischer Praxis. **[The selection principle in forestry: conclusions from 40 years of Swiss practice.]** Verlag Paul Haupt, Bern & Stuttgart. 3rd ed. (rev.) 1951. pp. 160 + 25 plates. [G.] Price *DM*10·40 [£1. 0*s*. 0*d*.]

The present edition has been somewhat expanded, but its general plan and substance correspond to those of its predecessor. [See *For. Abstr.* 8 (No. 1717).]

226. *Changes of Silvicultural System. Conversion (by System or Species)*

See also No. 2053.

2091. Dannecker, K. Das Plenterprinzip im Fichtenwald des Niederungslands. **[The selection system in Spruce forest at low altitudes.]** *Schweiz. Z. Forstw.* 104 (1/2), 1953 (41–8). 9 refs. [G.f.]

Describes a successful attempt at conversion of pure, even-aged Spruce at 350–500 m. altitude, to uneven-aged, selection forest.

2092. Fraser, J. W. **Seed-spotting of conifers under a mixed hardwood stand.** *Silv. Leafl. For. Br. Can.* No. 67, 1952. pp. 3.

Spot sowing of *Picea glauca*, *Pinus strobus* and *P. resinosa* under a thinned stand of mixed hardwoods was unsuccessful, as the conifer seedlings were unable to compete with hardwood regrowth and shrubs.

2093. Little, S., and Moore, E. B. **Mechanical preparation of seedbeds for converting Oak-Pine stands to Pine.** *J. For.* 50 (11), 1952 (840–4). 6 refs.

Mechanical disking was found to be effective for preparing seedbeds favourable to Pine in the Oak/Pine forests of southern New Jersey, but the uncertainty of catching a good seed crop makes the results doubtful. In the authors' experiments, disking alone was not sufficient to ensure the dominance of Pine regeneration over hardwood coppice shoots.

228. *Constitution and Composition of Stands; Forms of Stands. Tree Classes*

See also Nos. 1902, 2118, 2231–2, 2532, 2542–3, 2556.

2094. Correia, C. A. Paixão. Constitution des peuplements de chêne-liège. **[Constitution of Cork Oak stands.]** *Publ. Serv. flor. aqüic. Portugal* 18 (2), 1951 (127–34). [F.]

Data are presented on the constitution of some typical Cork Oak stands in Portugal.

2095. Wilson, A. K. **An age-vigor tree classification for Douglas-Fir in Central Idaho.** *J. For.* 50 (12), 1952 (929–33). 8 refs.

2096. Karpiński, J. J. Z Zakładu Badania Lasów Pierwotnych. **[Virgin-forest Section [of the Forest Research Institute, Warsaw].]** *Sylwan* 96 (3), 1952 (371–3). [Pol.]

A short account of its main activities.

2097. Šafar, J. Problem izmjene vrsta u šumama. **[The problem of succession in forests.]** *Šum. List* 76 (4), 1952 (89–100). [Croat.e.]

A general discussion of both natural and artificially induced succession is followed by a list of practical measures which, it is suggested, should be adopted in Croatia in order to counteract undesirable succession, in particular the increase of Hornbeam in mixed Beech/Hornbeam, and Oak/Hornbeam stands. The author recommends frequent stocktaking of low-yield stands and calculating the profit attainable if the stand composition were suitably altered; and also (1) checking the succession of mixed Oak to Hornbeam/Beech, mixed Beech to pure Hornbeam, and Fir/Spruce to Beech, and controlling forest weeds; (2) effecting the gradual transformation of Oak/Ash into Oak/Hornbeam stands on soils that are no longer suitable for Oak/Ash; (3) accelerating the natural invasion of Fir into Beech stands, and the transformation of Pine plantations in the Karst into mixed forest of indigenous broadleaved species.

2098. Polk, R. B., and Boe, K. N. **Succession of trees in cut-over Larch/Douglas-Fir stands in Western Montana.** *Proceedings of the Montana Academy of Sciences, Missoula, Mont.* 10, 1950 (1951), (31–7). L.B.M.N.

In the over-storey the Larch/Douglas-Fir basal-area ratio, equal to 2 : 1 before logging, was roughly 1 : 1 at the time of measurement (10–50 years later). The % of pole-size Larch had declined since logging. At the time of measurement, seedling and sapling Larch made up 8%, Douglas Fir 68%, and other species 24% of the total reproduction. The reproduction for either species was somewhat more abundant on N. than on S. aspects. Larch reproduced better under lighter reserve stands; Douglas Fir seems to like stands of intermediate density. Bare mineral soil is superior for Larch regeneration.

23. REGENERATION AND FORMATION OF STANDS

2099. Kayacik, H. Doğu lâdini (*Picea orientalis* Lk. Carr) nin Türkiyedeki coğrafi yayılısı, silvikültür esasları ve tabii sınırlarnın genişletilmesi imkânlarını araştırma. **[The distribution of *P. orientalis* in Turkey, its basic silviculture and**

investigations into the possibilities of its natural spread.] *Tar. Bak. Orm. gen. Müd. Yay.* No. 103/20, 1952. pp. 122 + 4 gphs. + 2 tbls. + 1 map. 70 refs. [Turk.turk.g.]

Discusses the natural distribution of *P. orientalis* (sometimes in pure stands and sometimes with *Fagus orientalis*, *Abies nordmanniana*, and *Pinus sylvestris*), its uses, the possibility of management for natural regeneration, and the use of artificial regeneration as a complement to it and to reforest clear-felled areas. *From author's summary.*

2100. ASIDDAO, F. **Natural versus artificial reproduction of Dipterocarp species.** *Philipp. J. For.* 7 (1/4), 1950 (1952), (63–79 + 2 photos). 4 refs.

Results of trial plantings in different districts are discussed. They show that Dipterocarp species cannot be successfully planted in extensive, barren and worn-out open lands, because of poor moisture and lack of nurse trees; on such sites, fast growing species should be planted as an initial crop. In areas where only light selective logging has been done, regeneration will occur naturally. Bare ground around spar trees and loading booms, tractor roads and log landings, should be planted immediately after logging operations cease, before the ground hardens or is invaded by weeds and grasses.

231. *Natural Regeneration*

See also Nos. 2018 *et seq.*, 2074, 2087–8, 2098, 2359–60, 2504.

2101. FENTON, G. R. **Regeneration of *Pinus radiata* D. Don following fire.** *For. Res. Notes N.Z. For. Serv.* 1 (4), 1951 (1–10 + 9 photos + 2 gphs. + 1 map).

A detailed study of the development of dense regeneration following the complete destruction by fire of young *P. radiata* and *P. pinaster* plantations 3, 7 and 12 years before, including the incidence of disease (*Armillaria mellea*) and insects (*Hylastes ater*, *Ctenopseustis obliquana* and *Sirex noctilio*). The natural mortality was quite insufficient to reduce the density adequately up to 12 years (*P. radiata*—2600 green stems/acre, dominants 54 ft. high). Data from mechanical thinnings started experimentally (4 grades removing from 55 to 94% of the crop, plus controls) are tabulated to show the man-hours required. Costs of treating 7-year regeneration were more than that for the same treatment of 3-year. Recommendations on thinning régimes for such stands are made. [Cf. *For. Abstr.* 13 (No. 3824).]

2102. CROSSLEY, D. I. **Discing in overdense Lodgepole Pine reproduction.** *Silv. Leafl. For. Br. Can.* No. 66, 1952. pp. 3.

An experiment was made in disking an over-dense, stagnant stand of 11-year-old reproduction on a burnt-over area, (*a*) in parallel swaths leaving undisked strips, and (*b*) all over the area, in order to reduce the density. Results were not promising, as only 39% were killed and 25% damaged.

2103. DIMBLEBY, G. W. **Natural regeneration of Pine and Birch on the heather moors of north-east Yorkshire.** *Forestry* 26 (1), 1953 (41–52). 6 refs.

Both Pine (*Pinus sylvestris*) and Birch (*Betula pubescens*) usually invade after a fire, the invasion reaching greatest force after 3 to 5 years, then falling off rapidly, probably with the return of the heather (*Calluna*). Pine seedlings only grow vigorously if their tap-roots reach the pan, when secondary roots are developed extensively. In Birch the tap-root is not well developed, but secondary roots spread vigorously, sending down sinkers to penetrate the pan. Regeneration of Birch is helped by rotten stumps and roots which its mycorrhizal roots explore. The root forms are compared and contrasted and the findings compared with the work of Laitakari and Erteld. [Cf. *For Abstr* 4 (162).] *Author's summary.*

2104. **Natural regeneration of *Abies spectabilis* and *Picea morinda*.** *For. Res. India Burma 1947/48, Pt. II*, 1952 (37–8).

Observations carried out in experimental plots in Lower Bashalar forest division, E. Punjab, on natural regeneration of Silver Fir (*A. spectabilis*) and Spruce (*P. morinda*) led to the following conclusions. (1) A thick layer of raw humus, heavy felling debris, and heavy weed growth are factors inimical to regeneration, and drastic soil treatment is needed to create favourable conditions. (2) Judging from the age of the oldest seedlings, it appears that, with light slash burning after a seeding felling, it takes 8–10 years for the partial decomposition of humus to create conditions favourable for the natural reproduction of these species. (3) There was very little natural regeneration outside the fenced plots, and closure to grazing is indicated as a condition of obtaining natural regeneration. Grazing should, however, be allowed for 1–2 years after a seeding felling in order to help break up the humus layer. (4) Light is evidently an important factor. Patches of Silver Fir seedlings were noticed growing up in areas protected from morning and midday sun. Research is needed on light requirements of these two species.

2105. PARKER, H. A. **Spruce regeneration on deep moss after logging.** *Silv. Leafl. For. Br. Can.* No. 62, 1952. pp. 2.

Fifteen years after logging, regeneration of *Picea glauca* on deep moss was inadequate, whereas all treated plots ((*a*) heavy burning, (*b*) light burning, and (*c*) stripping to mineral soil), prepared 5 years after logging, produced satisfactory regeneration from natural seedfall. The most satisfactory treatments were (*a*) and (*c*), but in (*c*) on wet sites, washing and frost-heaving caused much seedling mortality.

2106. CROSSLEY, D. I. **The survival of White Spruce reproduction originating from mechanical disturbance of the forest floor.** *Silv. Leafl. For. Br. Can.* No. 63, 1952. pp. 3. 1 ref.

An interim report on a long-term project [cf. *For. Abstr.* 11 (No. 1758)]. On the scarified areas some mortality from frost-heaving occurred, but since the reproduction was so dense, this had a rather beneficial result.

2107. CROSSLEY, D. I. **White Spruce reproduction resulting from various methods of forest soil**

scarification. *Silv. Res. Note For. Br. Can.* No. 102, 1952. pp. 18 + 4 photos. 7 refs.
Cf. *For. Abstr.* 13 (No. 2017).

232. *Artificial Regeneration*

See also No. 2074.

2108. Lizardo, L. **Benguet Pine (*Pinus insularis* Endl.) as a reforestation crop.** *Philipp. J. For.* 7 (1/4), 1950 (1952), (43–60 + 6 photos).
Gives details of nursery practice, planting, and protection of the crop, with available data on cost of establishment, yield and probable financial return.

2109. **Sandal [*Santalum album*] regeneration experiment 1948.** *For. Res. India Burma 1948/49, Pt. II*, 1952 (33).
An experiment was made in Coorg to determine the comparative merits of (*a*) sowing untreated seed, (*b*) dibbling germinated seeds, (*c*) transplanting 1-year-old pruned seedlings and (*d*) transplanting 1-year-old unpruned seedlings. Survival and height in inches at the end of the first year were: (*a*) 90%, 16·7; (*b*) 73%, 16·5; (*c*) 88%, 22·3; (*d*) 87%, 27·5. The poor survival of (*b*) was unexpected.

232.1. Choice and Trial of Species, Races etc.

See also Nos. 2198 *et seq.*, 2246, 2254.

232.11. *Species Trials (by Localities), including Forest Gardens, Trials of Exotics etc.*

2110. Galoux, A. Les principales essences forestières de l'Amérique septentrionale tempérée: leur introduction en Belgique. **[The principal forest species of temperate north America: their introduction into Belgium.]** *Trav. Sta. Rech. Groenendaal (Sér. B)* No. 13, 1951. pp. 141 + 12 photos + 12 maps. 135 refs. [F.]
An account of natural distribution and silvicultural characters of 26 N. American species together with data on their introduction and increment in Europe (particularly Belgium).

2111. Galoux, A. Le sapin de Douglas aux États-Unis, son introduction en Europe et specialement en Belgique. **[Douglas Fir in the U.S.A., its introduction into Europe and particularly into Belgium.]** *Bull. Soc. for. Belg.* 59 (11), 1952 (457–99 + 6 photos). 56 refs. [F.]
Mainly an extract from the same author's monograph on American forest species and their acclimatization in Europe.

2112. Heiberg, H. H. H. Inntrykk fra Nord-Amerikas skogbruk. **[Impressions of North American forestry.]** *Suppl.* to *Tidsskr. Skogbr.* 61 (2), 1953. pp. 31. 7 refs. [Nor.e.]
Account of a tour to Canada and the U.S.A. sponsored by ECA and the Norwegian government under TA 48–96, including recommendations on the provenance of seed of North American softwood species grown in Norway.

2113. Gibson, W. N. **Exotic conifers and their importance to forestry in Northern Ireland and the west of Scotland.** *Scot. For.* 7 (1), 1953 (3–10).
A paper read to the British Association for the Advancement of Science, Belfast, 1952, giving brief particulars of the success of some species on different types of site.

2114. Recke, Graf von der. Zur I. Inventur ausländischer Holzarten durch die Deutsche Dendrologische Gesellschaft. **[The 1st inventory of exotic tree species [in Western Germany] by the D.D.G.]** *Mitt. dtsch. dendrol. Ges.* (*Jb. 1951/52*) No. 57, [1952?] (20–1). [G.]
Comments in general on the response—chiefly by foresters and landowners—to a questionnaire recently issued by the D.D.G. with the aim of compiling such an inventory. Though incomplete, especially as regards park trees etc., the answers received enabled a first instalment of reports to be worked up for publication [see next abstract].

2115. Schenck, C. A. [Editor]. Ergebnisse der I. Inventur ausländischer Holzarten. **[Results of the 1st inventory of exotic tree species [in Western Germany].]** *Mitt. dtsch. dendrol. Ges.* (*Jb. 1951/52*) No. 57, [1952?] (21–66). [G.e.]
[See preceding abstract.] Reports are made on *Larix laricina*, *Pinus contorta* var. *latifolia*, *P. monticola*, *P. ponderosa*, *P. resinosa*, *Thuja plicata*, *Tsuga heterophylla*, *Acer saccharum*, *Betula lutea*, *B. papyrifera* and *Liriodendron tulipifera*, giving for each species general notes on behaviour and possible value in Germany, and tables showing for each occurrence the situation and altitude, owner, number of trees or area of stand, and age, height and diameter of the trees.

2116. Borchers. Folgerungen aus den bisherigen Anbauergebnissen mit fremdländischen Holzarten im Gebiet des Landes Niedersachsen für die künftige waldbauliche Planung. **[Conclusions to be drawn for future silvicultural planning from the results so far obtained in trials of exotic tree species in Niedersachsen.]** *Mitt. dtsch. dendrol. Ges.* (*Jb. 1951/52*) No. 57, [1952?] (69–81). 7 refs. [G.e.]
Notes on various species, with an indication of the total area planted to each, and a few growth data. *Pinus strobus*, despite losses from blister rust, has done better than the native *P. sylvestris*. *Pseudotsuga taxifolia* has failed only in a few places on loess and chalk soils. *Larix leptolepis*, mostly in mixtures, has exceeded expectations. *Quercus borealis* has also done well, even on former heath soils. Unfortunately, the exact provenance is in no case known for these species. Successful small-scale plantations exist of *Thuja plicata*, *Abies nordmanniana*, *Chamaecyparis lawsoniana* and *Picea sitchensis*.

2117. Meyer, H. *Betula ermani* Cham. und *Betula maximowicziana* Regel, zwei bemerkenswerte asiatische Birkenarten. **[*B. ermani* and *B. maximowicziana*, two noteworthy Asiatic Birches.]** *Mitt. dtsch. dendrol. Ges.* (*Jb. 1951/52*) No. 57, [1952?] (106–7 + 1 map + 3 photos). [G.]
Brief general notes, with photos of trees in the Forstbotanischer Garten, Hann. Münden; trials are being made in the Lehrforstamt Bramwald and neighbouring forests, using 3000 seedlings of each species. *B. maximowicziana* has reached heights of

over 2m. in 3 years, and outgrows *B. verrucosa* in its first year.

2118. HENNECKE, K. Wuchsleistung und Anbauwürdigkeit von Fichte und Kiefer auf Sandböden in Schleswig-Holstein: zur Frage der Ertragssteigerung des Waldes durch die Holzartenwahl. **[Growth of Norway Spruce and Scots Pine, and their merits for planting, on sandy soils in Schleswig-Holstein: choice of species as a means of increasing forest yield.]** *Forstarchiv* 23 (2/3), 1952 (25–32). 4 refs. [G.g.]

Briefly reviews the history of afforestation on the sandy heaths of this region, and compares the performance of the two species in even-aged mixtures —144 stands formed ca. 1882—using data from enumerations in 1912 and 1938. During this period Spruce increased its representation in the stands at the expense of Pine, and shows considerable superiority in mean height, on the better sites (Spruce quality classes down to III). On poorer sites, the Pine has almost or quite maintained its position as regards both numbers and height. Disregarding the possible claims of exotic species to consideration, it appears that Spruce should be preferred as the main species for the better sites, where Pine is still worth considering as a secondary species in mixture with it, unless others—e.g. Japanese Larch—should be found superior. On these sites, use of Pine as the main species would entail a serious drop in yield. On the poorer sites, Pine should continue to be the main species, but should be planted pure only where it can be expected to produce valuable high-grade timber or where the site is altogether too poor for Spruce. No reason is found for discontinuing the planting of these or other high-yielding conifers on the sandy soils concerned, since in the author's opinion soil degradation can be prevented by a combination of technical and biological measures, e.g. ploughing, liming, use of mixtures, green manuring, and early and heavy thinning. Yield by volume and value may therefore be the decisive factor in choice of species.

2119. ELORRIETA ARTAZA, J., and MARTÍNEZ MATA, F. Introducción de especies exóticas en España. **[The introduction of exotic species into Spain.]** II Congreso Nacional de Ingeniería, Instituto de Ingenieros Civiles de España, Madrid 1950, Vol. IV, 1951 (449–75). [Span.]

Notes on a large number of such species (both coniferous and deciduous).

2120. ECHEVERRÍA BALLARÍN, I. Producción del *Eucalyptus globulus*—estudio de las leyes de crecimiento en la zona forestal de Huelva del Patrimonio Forestal del Estado. **[Yield of *E. globulus*—a study of growth in the State forests of the Huelva region.]** [*Bol.*] *Inst. for. Invest. Exp. Madrid* 23 (62), 1952. pp. 39. [Span.f.e.g.]

Presents preliminary data from sample plots in 18-year-old stands established on the sandy soils of Huelva province. The stands were planted under the State's reforestation programme, which also included plantations in Santander, Asturias, Pontevedra and Seville. They show a yield and growth in Huelva inferior to those of the other regions, but nevertheless, even on these poor soils, *E. globulus* can still be considered a rapid-growing species.

2121. GOES, E. DA S. REIS. Estudo sobre eucaliptos—sua aplicação ao sul do país. **[Eucalypts —their suitability for use in the south of Portugal.]** *Publ. Serv. flor. aqüic. Portugal* 18 (2), 1951 (259–327 + 7 plates). 20 refs. [Port.e.]

Deals with the natural distribution of Eucalypts, their silvicultural requirements, uses, and the possibilities for afforestation in Portugal, with notes on Eucalypt stands already existing in southern Portugal and a series of comments on individual species. Diagrams are included showing the corresponding homoclimes in Portugal and Australia for particular species.

2122. PAŞCOVSCHI, S., OCSKAY, S., and LĂZĂRESCU, C. Lista plantelor lemnoase exotice cultivate in R.P.R. **[A list of exotic woody species grown in Rumania.]** *Rev. Pădurilor* 66 (6), 1951 (9–13). [Rum.rum.russ.]

2123. SINGH, D. P. **Cultivation of Bat Willows in Kulu [Punjab].** *Indian For.* 79 (2), 1953 (115–20).

Describes trials of *Salix alba* var. *caerulea* and *S. fragilis* from Kashmir. The former is recommended for planting in the Punjab.

2124. SETTEN, G. G. K. **Benguet Pine, *Pinus insularis* Endl., at the Cameron Highlands, [Malaya].** *Malay. Forester* 15 (4), 1952 (207–8).

Account of an experimental plot, planted in 1932 from 1931 sowings, with some data on growth in 1952.

2125. BARNARD, R. C. **Experience with exotic tree species in Malaya.** *Malay. Forester* 16 (1), 1953 (29–40).

Includes notes on nursery and plantation experience with *Eucalyptus deglupta, E. robusta, E. alba, Swietenia macrophylla, Gmelina arborea, Shorea gysbertiana, Hymenaea courbaril, Eusideroxylon zwageri, Pinus insularis, Tectona grandis* and *Albizzia falcata.*

2126. ECKBO, N. B. **High veld plantations of the Modderfontein B. Gold Mines, Limited.** *J. S. Afr. For. Ass.* No. 22, 1952 (60–2).

Some data on growth of *Pinus patula* at an altitude of over 5500 ft.

2127. PULGAR VIDAL, J. El eucalipto en Colombia. **[*Eucalyptus* in Colombia.]** *Agric. trop., Bogotá* 8 (3), 1952 (31–6). [Span.] A.P.B.

Brief notes on the introduction of *Eucalyptus* into Colombia, with a list of species suitable to be grown in the Colombian climate for various purposes.

232.12. *Races and Provenance Trials*

See also Nos. 1951–3, 2110–2.

2128. MIROV, N. T., DUFFIELD, J. W., and LIDDICOET, A. R. **Altitudinal races of *Pinus ponderosa*: a 12-year progress report.** *J. For.* 50 (11), 1952 (825–31). 16 refs.

The first 12 years' growth of *P. ponderosa* derived from seed trees distributed from 125 to 6919 ft. above sea level on the west slope of the northern

Sierra Nevada in California was studied in plantations at 960, 2730, and 5650 ft. Height growth of plants from 2 to 12 years showed a maximum for seed trees situated from 1500 to 3500 ft. above sea level. The same result was found in all 3 plantations. No differential winter injury was sustained up to 13 years at the highest elevation. *From authors' summary.*

232.2. Preparatory Work, Auxiliary Measures

See also Nos. 2209, 2248, 2258, 2288.

2129. Soljanik, I. Prilog proučavanju prethodne obrade šumskog zemljišta za veštačko pošumljavanje. **[Preliminary cultivation of forest soil for artificial regeneration.]** *Šum. List* 76 (10/11), 1952 (364–76). 26 refs. [Croat.croat.]

A discussion of the pedological conditions of soil fertility, the effect of preliminary cultivation on soil micro-organisms and plant metabolism, and of the techniques of soil cultivation, based on Russian, Jugoslav and Swiss literature.

2130. Loycke, H. J. Maschinelle Bodenbearbeitung in Beständen. **[Mechanical soil working in stands.]** *Forstarchiv* 23 (2/3), 1952 (32–40). 3 refs. [G.]

Reports on performance tests on 9 different site types, in Hesse and S. Germany, of 4 implements: (1) the 'Roller I' disc plough—total weight 922 kg.; 4 discs giving a working breadth of 92 cm. and adjustable to a depth of 10–30 cm.; designed for use with a 36–45 h.p. tractor; made by Maschinenfabrik Gebr. Eberhardt, Ulm/Donau; (2) Holm's disc plough—total wt. 228 kg.; 3 discs giving a working breadth of 100 cm. and depth of 10–15 cm.; drawn by 2–3 horses or a 20–26 h.p. tractor; made by Maschinenfabrik Ludwig Warncke, Mölln/Lbg./Holst.; (3) Hartmann's 'Hessischer Schwinggrubber'—total wt. 320 kg.; 3–5 interchangeable tines of 3 different types, giving a max. working breadth of 125 cm. (min. 51) and depth of 10–15 cm.; with spring device enabling each tine to lift independently of the others on meeting obstacles; drawn by 2–3 horses if all 5 tines are used, 1 strong horse if only 3 tines are required; distributed by Forstliche Gerätenutzungs- und Bezugsgenossenschaft für Nordwestdeutschland e.G.m.b.H. 'Forstkultur Nordwest', Hamburg and Bahrenfeldt; (4) the 'Pionier' forest rotary cultivator—total wt. 400 kg.; working breadth 45 or 60 cm.; depth 10–20 cm.; powered by a 9·5 h.p. air-cooled 2-stroke motor, consuming 2–3 litres petrol/oil (1/20) mixture per hour; speed in first gear 1·3, in second 2·0, and in third 4·8 km./hr.

Photographs of each implement are included, with notes on their performance on the various site types, followed by a list of the site types indicating for each the implements that could be used and the type of work that they could do. Some attempt is also made to indicate performance/hour, costs/machine-hour and costs/ha.

2131. Hellinga, G. Bosbouw en voedselproductie. **[Forestry and food production.]** *Rimba Indonesia* 1 (1), 1952 (3–26). [Du.e.]

Discusses the land problem in Indonesia, the effect on the soil and crop yields of shifting cultivation, yields of foodstuffs in Java from *taungya* plantations on forest-service land, and other social and economic advantages of *taungya*. Possible methods of increasing food production are: an extension of the forest area, which would, however, mean increased labour and costs in tending the forests; an extension of the cropping period in the plantations, which would have a bad effect on tree growth and soil; and the use of tree species with shorter rotation periods. Short-rotation management of *taungya* plantations, however, also depletes the soil too much, e.g. the *Acacia decurrens* plantation in the lowlands of Java.

2132. **Effect of different *kumri* crops on Teak raised with them.** *For. Res. India Burma 1948/49, Pt. II*, 1952 (37).

The results of several experiments have shown that hill paddy, chillies, cotton, millet, tapioca, horse gram, and ginger can be grown along with Teak without causing significant loss in height growth. Maize, however, does significantly reduce height growth of Teak and should not be used as a *kumri* crop.

232.3. Seed, Nursery Practice, Direct Sowing

232.31. *Seed*

See also Nos. 2419–20, 2433–4, 2478, 2482.

2133. Carman, R. S. **How tree seed is procured: the collecting, extracting, processing and storing of tree seed with particular reference to heredity and provenance.** *Pulp Paper Mag. Can.* 54 (1), 1953 (100 . . 107). (*Woodl. Sect. Index Canad. Pulp Pap. Ass.* No. 1276 (*F*–2).)

Deals with practice in Ontario, relating chiefly to the pulpwood species (White and Black Spruce, Jack Pine and Balsam) of the region.

2134. Minin, D. D. Sběr a uskladňování semen lesních dřevin. **[Harvesting and storage of see s of forest woody species.]** *Lesn. Knihovna* (*malá Řada*) No. 13, 1952. pp. 69. [Cz.] Price *Kčs.*14.

A practical popular handbook, translated from the Russian original: *Sbor i hranenie semjan drevesnyh i kustarnikovyh porod*, Selhozgiz, Moscow, 1951.

2135. Milević, K. Šumsko-semenska služba u NR Srbiji. **[Forest-seed service in Serbia.]** *Šumarstvo* 5 (5), 1952 (353–64). [Serb.f.]

About 68,000 kg. of coniferous seeds (ca. 75% being Silver Fir and Spruce) were collected in Serbia during 1947–51, against 2,504,000 kg. of hardwoods (including ca. 1,760,000 kg. for different *Quercus* spp., 156,000 kg. for *Castanea sativa*, and 109,000 kg. for *Robinia pseudoacacia*). The quantities collected show a steady increase from year to year. Considerable amounts of conifer seeds are kiln extracted (in particular *Pinus nigra*, *P. sylvestris*, and *Picea abies*). Results are tabulated of tests of seed purity, weight (per 1000 seeds), germinative capacity, and germinative energy, conducted by the Forest Research Institute of Belgrade for 16 hardwood and conifer species.

2136. Brixy, S. Prilog unapređenju uspjeha sjetve pit. kestena. **[Improving the success of direct sowings of *Castanea sativa*.]** *Šum. List* 76 (4), 1952 (109–13). 3 refs. [Croat.e.]

Chestnut stands in Croatia usually regenerate by coppicing, while new ones are grown from seed. Since 1945, about 150,000 kg. of Chestnut seeds have been sown on ca. 3000 ha. every year. The results have so far not been very good, mainly because the seed used did not comply with requirements. In order to prevent fermentation, the seed should not be harvested during rainy periods or, if harvested then, should be stored so as to get rid of excess moisture, and then sown immediately. On the other hand, excessive dryness is also harmful. Results are tabulated of tests on the drying of Chestnut seeds stored in an unheated room immediately after collection late in October, 1951. During the 1st week the seeds lost nearly 67% of the total water loss after 8 weeks; during the 2nd week, only 22·5%; 3rd week, 7·4%; 4th, 1·6%. It follows that, in order to preserve the viability of the seed when sown in dry soil, it should be sown during the first half of the first week following collection, not 8–14 days after collection as is the general practice.

232.311. Seed Production (Seed Years, Seed Crops; Seed Orchards and Methods of Inducing Seed Production).

See also Nos. 1944–6, 2018–21, 2141.

2137. Parkin, K. F. **The establishment of forest seed orchards in Northern Ireland.** *Irish For.* 9 (2), 1952 (67–9).

A beginning has been made with grafted Larch plants in the nursery at Newcastle forest. The aims and methods of the scheme are explained.

2138. Wareing, P. F. **Experimental induction of male cones in *Pinus sylvestris*.** *Nature, Lond.* 171 (4340), 1952 (47). 1 ref.

It was observed on several young (12-year-old) Scots Pines which had not yet begun regularly to bear cones, that a few isolated cones were borne on vegetative shoots of which the terminal bud had failed to develop in the previous year because of insect attack. As a result of this destruction of the terminal bud, the uppermost 'dwarf shoots' (bearing paired needles) had been stimulated to produce a resting bud, and it was in such buds that male cones had developed. To determine whether experimental removal of terminal buds would have the same effect, a considerable number of shoots on the lower branches of 10 of the trees were disbudded by hand in January 1951; in May 1952 it was found that 242 out of 472 treated shoots (53%) had developed male shoots and that these were the only ones present on the trees apart from a few isolated male cones again found associated with insect destruction of the normal terminal bud. On some branches all the treated shoots had produced male shoots. It is suggested that disbudding to produce male cones on young trees of *P. sylvestris* might prove a valuable addition to such techniques as bark ringing and strangulation already used in forest tree breeding.

232.312. Seed Collection, Extraction and Grading (including Seed Weight)

See also Nos. 1866, 1943, 2024–5, 2158, 2161, 2508.

2139. Stefansson, E. Något om problem vid insamling och klängning av tallkott: ett förelöpande meddelande. **[Problems in the collection and extraction of Pine cones: a preliminary report.]** *Skogen* 40 (1; 1*), 1953 (12–5; 6*–8*). [Sw.]

Results of a series of investigations on cones from trees in central and N. Sweden include the following: (1) Seed ripening varied with the district; in 3 districts embryo development continued after 15 September, while in the fourth it was already complete. (2) When cones were collected on 15 September, the degree of extraction increased with storage, for periods ranging, for different samples, from 1 to 4½ months. This increase by storage was not, however, as great as that for cones left on the tree until extraction. The degree of extraction of cones collected in November, was roughly the same after 2, but very much less after 4½ months' storage. (3) In most of the samples of seed collected in September, embryo length as a % of embryo-sac length was lower after 2 months' storage than in seed left on the tree, although in one sample, embryo development was more rapid during storage. All samples lost in quality during storage for 4½ months. (4) Viability of seed from cones picked in September increased with storage up to 2 and in one sample up to 4½ months, but was lower that that of seed left on the tree. (5) Experiments on the effect of extraction temperature on viability suggest that cones collected early in the autumn and extracted at once should be treated at 40° for 3–5 hours and that the temperature should then be raised gradually to 55–60°. Cones collected in winter or spring can be extracted at 45–50° for 3–5 hours and the temperature then gradually raised to 60 or even 65°. [Cf. *For. Abstr.* 13 (Nos. 3757, 3761).]

2140. Arnborg, T. Avvingningsapparat av ny modell. **[A de-winging apparatus of a new type.]** *Skogen* 39 (12*), 1952 (135*). [Sw.]

The apparatus, in use at the cone-extraction department of AB Iggesunds Bruk, is described with illustrations. Run from a ⅓ h.p. electric motor, it consists of a feed chamber (33 × 33 × 36 cm., of 40 litres capacity) above, a brush chamber, and a seed chamber below. Seeds are fed down into the brush chamber where two brushes rotating at 95 revs./min. towards each other are set in beds, lined with grooved rubber, in the bottom of the chamber. The brushes are 30 cm. long and have a wooden core, diam. 35 mm., carrying horse-hair bristles 18 mm. long. There is a longitudinal opening in the wall of the chamber along the outer side of each brush, through which seeds fall into the seed chamber, the wings and empty seeds being removed by a fan. The extent to which the brushes press together, and hence the severity of the de-winging operation, can be controlled. Germination tests have shown that the seeds are not damaged in the process, and the method has proved satisfactory in use. An apparatus [not described] for cleaning cones of needles etc. is also in use.

2141. YOUNGBERG, C. T. **Effect of soil fertility on the physical and chemical properties of tree seed.** *J. For.* 50 (11), 1952 (850–2). 19 refs.

[Cf. *For. Abstr.* 13 (No. 2909).] Seed of several provenances of *Picea abies* (including European) and *Pinus resinosa* was tested, and at the same time soil samples were taken and analysed from under the seed trees. There appeared to be a definite relation between seed weight and germination capacity, and seed weight and soil fertility. It is noted, however, that seed collected from the same stands in different years showed a great variation in average weight, e.g. seed collected in 1948 was twice as heavy as that collected in 1947. Valid comparisons of seed quality cannot, therefore, be made without regard for annual variations. The general results indicate that it would be advisable to avoid infertile soils when choosing sites for seed 'orchards'.

232.315. Seed Storage and Treatment

See also Nos. 2158, 2160–1, 2173, 2253.

2142. SCHUBERT, G. H. **Germination of various coniferous seeds after cold storage.** *For. Res. Note Calif. For. Range Exp. Sta.* No. 83, 1952. pp. 7. 6 refs.

Results of germination tests on about 40 species after cold storage from 2 to 24 years are tabulated and discussed. They show that most species will retain viability for intervals long enough to tide over the poor seed years. Seed of *Cupressus* and *Pinus* spp. (especially closed-cone Pines) retained high viability up to 17–21 years.

2143. JAROŠ, P. Jak přezimovaly a po vysetí na jaře 1952 klíčily bukvice sklizně 1951/52? **[The winter storage of Beech mast of the 1951/52 harvest, and its germination following sowing in spring of 1952.]** *Lesn. Práce* 31 (5), 1952 (206–8). [Cz.]

On 20 December, 1951, a consignment of ca. 6000 kg. of Beech mast was put into cold storage, with temperature varying from − 0·3 to + 1° C. and air relative humidity 93–98%. Sample lots (1–2 kg. each) were stored in different conditions, viz.: (1) out of doors, in sackcloth, on soil at the foot of a Yew tree; (2) in a basket on the concrete floor of a cold room with sufficient ventilation; (3) on relatively warm soil with vigorous aeration, the lowest temperature being − 6°; (4) in a cellar, in flower-pots on shelves at 3–8°, with poor ventilation; and (5) in moist sand in the same cellar. The original Beech mast, 82·5% sound on dissection, weighed ca. 285 g./1000. On 26 March, 1952, the cold-stored Beech mast was 79% sound, and weighed 281·3 g./1000; for the sample lots, the comparable figures were: (1) 81%, 322 g.; (2) 76%, 254·7 g.; (3) 75%, 245·2 g.; (4) 80%; and (5) all nuts had already sprouts 2–4 cm. long. The germination % for the cold-stored Beech nuts sown on 31 March was 60%, the respective figures for the others being: (1) 82%, (2) 60%; (3) 52%; (4) 60%; and (5) 48%.

2144. POPCOV, A. V., and BUČ, T. G. O faktorah, sposobstvujuščih sohraneniju vshožesti semenami ivy. **[Factors contributing to the preservation of viability in Willow seeds.]** *Dokl. Akad. Nauk SSSR* 83 (3), 1952 (489–92). 20 refs. [Russ.] A.P.B.

Seed of *S. nigricans* and *S. pentandra* stored in closed vessels at controlled relative humidities (r.h.) was found to retain its viability longest between 10 and 33% r.h., corresponding to moisture contents of 3·75–7·4% in the seed itself. Storage at 6–8° C. gave better results than at room temperature. The two species behaved slightly differently, *S. pentandra* seed storing better at ca. 10% r.h. and *S. nigricans* at 33%. At these r.h. values and 6–8° C., the former still had a germinative capacity of 69% after 11½ months, and the latter of 61% after 8½ months.

2145. MANN, W. F. **Stratified Pine [*Pinus taeda*] seed for direct seeding.** *Tree Plant. Notes* No. 11, 1952 (3).

Stratification for 90 days in wet sand at 38° F. accelerated germination of *P. taeda* seed from only 6% after 30 days for untreated seed, to 59% in 15 days. Shorter periods of stratification (30 and 60 days) were much less effective.

2146. MIEGROET, M. VAN. Recherches sur la signification de quelques substances actives synthétiques pour la culture des plants forestiers. Communication no. 1: L'influence de quelques substances actives synthétiques sur la germination du pin sylvestre. **[Studies on the value of synthetic growth substances in the raising of forest plants. Communication No. 1: the influence of some synthetic growth substances on the germination of *Pinus sylvestris* seed.]** *Schweiz. Z. Forstw.* 103 (12), 1952 (506–22). 10 refs. [F.g.]

Experiments were made in soaking *P. sylvestris* seed of different provenances in different concentrations of vitamin C, glutathion, and β-alanine for different periods at different temperatures. The only strong positive effects on speed of germination and germination % were obtained from soaking for 24 hours at 21° C. in vitamin C at a concentration of 50 mg./100 ml., for 2 out of the 5 provenances given this treatment. The results as a whole were not sufficiently clear to enable any general deductions to be made, but it is evident that provenance of the seed, the concentration of the solution and the germination temperature all affect the results.

2147. ŠIBENIK, M. Močenje semena zelenega bora pred setvijo—odličen uspeh. **[Excellent results obtained by soaking seeds of *Pinus strobus* before sowing.]** *Gozd. Vestn.* 10 (7), 1952 (217). [Sloven.]

Seeds were soaked for 14 days in water that was changed every other day; when sown after some drying, they germinated 100%. Controls gave very poor germination and growth.

2148. **[Treatment of Toporite (*Hernandia sonora*) seed.]** *Rep. For. Dep. Trin. Tob. 1951*, 1952 (13).

Puncturing the nut at a point below which there was an air space, and treatment with fungicides, raised the germination % from 18 in 5 months to 83 2 months.

2149. WATANABE, S. **[Silvicultural studies on Kusu (*Cinnamomum camphora*) (1) On the heterospermy of seeds.]** *Bull. Tokyo Univ. For.* No. 39, 1951 (13–20). [Jap.jap.e.]

Kusu seeds can be classified into two types, hard and normal. The hard type were smaller and darker than normal seeds, and had a lower germination %. Hot-water treatment increased the germination of the hard seeds to that of the normal seeds, but reduced the germination of normal seeds. After 6 months' storage, the germination % of normal and hard-type seeds was 22 and 2% respectively. The use of normal seeds is recommended; if hard-type seeds are used they should be treated with hot water. *From author's summary.*

2150. MOFFETT, A. A. **Differential germination in the Black Wattle (*Acacia mollissima* Willd.) caused by seed treatment.** *Rep. Wattle Res. Inst. S. Afr. 1951–52*, 1952 (39–50). 9 refs.

The Black Wattle (*Acacia decurrens* var. *mollissima*) produces hard-coated seeds requiring some form of treatment prior to sowing in order to render them permeable. Chipping the seed-coat with a razor or immersing the seed in hot or boiling water have the desired effect, the former method giving the higher germination. All seeds are not equally hard-coated. An interaction between hot-water treatment and seed-coat sensitivity to it leads to differential germination, the degree of which depends upon the severity of the treatment. When seed is divided into three size groups, the larger seeds have a higher proportion with sensitive coats than have medium or small seeds. This results in a depression in the % germination of the larger seeds following the severer treatments and an increase in germination following the milder treatments, compared with smaller seeds. Hot-water treatment may affect the embryo adversely, slowing down or depressing germination and, at the same time, rendering the seed more liable to fungal or bacterial attack. The weight of this attack may accentuate or modify the differential germination. The adverse effect of hot-water treatment is not necessarily permanent; under favourable conditions, such as dry storage, seed may recover to a considerable extent from treatment effect. There is some evidence that seed size in Wattle is at least partly controlled by genetic factors. It is suggested that by using hot-water treatment, seed is subjected to a hitherto unsuspected selective force. *From author's summary.*

232.318. Seed Testing. Germination Tests. Seed Quality.

2151. PARKER, J. **New methods for the determination of forest tree seed germinability.** *J. For.* 51 (1), 1953 (34–5). 2 refs.

Describes and discusses refinements developed in Germany by Lakon for testing the germinability of tree seeds with 2,3,5-triphenyl tetrazolium chloride (TTC) [cf. *For. Abstr.* 13 (p. 9)]. The author has found in experiments with many species of conifers from the S.E. United States that stratification for 6 weeks at 40° F. is desirable before conducting germination tests.

2152. ON, D. **2,3,5-triphenyl tetrazolium chloride as a viability indicator of certain coniferous seeds.** *Abstr. of thesis*, in *J. For.* 50 (11), 1952 (868).

Satisfactory results were obtained with seeds of *Pinus monticola, P. ponderosa, P. edulis* and *Pseudotsuga taxifolia*, the chemical test giving substantially the same results as direct germination tests.

2153. HATANO, K. **[Tetrazolium salts in seed germination testing.]** *J. Jap. For. Soc.* 34 (2), 1952 (37–41). 19 refs. [Jap.]

Figures showing comparative results obtained from viability and germination tests and by staining with tetrazolium salts for a number of agricultural plants, and over 40 trees and shrubs, are given in tables with English legends.

2154. VOLKOV, F. I. Udeljnyĭ ves želudeĭ kak pokazatelj ih zrelosti i posevnyh dostoinstv. **[Specific gravity of acorns as an index to their ripeness and their value for sowing.]** *Dokl. Akad. Nauk SSSR* 85 (1), 1952 (203–6). 6 refs. [Russ.] A.P.B.

Data on sp. gr., colour, absolute average weight per acorn, moisture content (m.c.) and germinative energy (measured by the number of days to reach a laboratory germination of 100% after removal of pericarp, in darkness, at 20–22° C.) are tabulated for acorns of *Quercus robur* collected in Moscow province at intervals from 10 August to 5 October, 1951 to show that: (1) Ripening was accompanied by an increase of sp. gr. from 1·025–1·045 to 1·200–1·240, with a corresponding increase of absolute weight and a decrease of m.c. (2) Germinative energy increased with increasing sp. gr. (3) A critical point in ripening occurred at about 8 September, after which the changes in sp. gr., m.c. and weight became less rapid, but germinative energy continued to increase rapidly.

A check was also made on batches of acorns from various parts of Russia, to determine for each batch the % of acorns in different sp. gr. ranges and their germinative capacity. The last in every case increased with increasing sp. gr., so that it should be possible to assess the quality of the seed from the % distribution of acorns by sp. gr. classes. It is also stated that physiologically ripe seed displayed higher resistance to fungus infection than unripe seed.

2155. CLIFFORD, E. D. **Vermiculite as a medium for germination testing.** *Tree Plant. Notes* No. 11, 1952 (4–5).

In germination tests of Jack Pine seed, that sown in flats filled with vermiculite germinated as well and quickly as that sown in sterile sand. Owing to its lightness and ability to absorb water, vermiculite is much preferable to sand, and it is proposed to make further tests with it at Chittenden Nursery, Wellston, Mich.

2156. TODA, R., and IS[H]IKAWA, H. **[Effect of diffused light on the germination of *Paulownia* seeds.]** *J. Jap. For. Soc.* 34 (8), 1952 (250). 4 refs. [Jap.e.]

In experiments in which seeds of *P. tomentosa* were kept in darkness at 25° C. on a germinating bed of 1% agar, 3% had germinated in 2 weeks, whereas 73–4% of those kept in diffused light had germinated. A 10-minute break in the period of darkness had no effect.

232.32. *Plant Rearing. Nursery Practice*

See also No. 2125.

2157. Olive, C. L., Jr., and Umland, C. B. **Cost accounting in TVA forest nurseries.** *J. For.* 50 (11), 1952 (831–3).

2158. Gooch, F. S. **Nursery culture of Cypress.** *Sth. Lumberm.* 186 (2324), 1953 (37–8).

Describes techniques successfully used in Louisiana for seed collection, treatment and testing, soil preparation, sowing, cultivation and irrigation, and gives notes on growth in nurseries of Cypress [*Taxodium*].

2159. Karschon, R. **Influence of soil on the development of Pines in nurseries.** *La-Yaaran* 2 (2), 1952 (35–6, 47). [Heb.e.]

Preliminary investigations at the Ilanoth Forestry Research Station have shown the importance of raising seedlings of *P. halepensis*, *P. brutia* and *P. nigra* in nurseries having soil and climate similar to that of their natural habitat and of the planting site. *From author's summary.*

2160. Karschon, R. **Raising trees and shrubs native to Wadi Araba in nurseries.** *La-Yaaran* 2 (3), 1952 (68–71, 84). [Heb.e.]

Nursery experiments were made before experimental planting in the Wadi Araba, a desert with 25–50 mm. annual rainfall. The following results were obtained: *Acacia raddiana* seeds should be immersed in H_2SO_4 for 1–2 hr. and then in water at room temperature for 24 hr. before sowing. Treatment with boiling water has a selective action, as only seeds damaged or destroyed by insects (Bruchidae) swell. *A. spirocarpa* seeds can be treated as above or immersed in water that has been brought to the boil and allowed to cool for 24 hr. The selective action of boiling water is less pronounced than with *A. raddiana*. Seeds of both species are sown in spring and transplanted to containers after 1 month. *Calligonum comosum* seeds need no pretreatment; they can be sown in spring in tins of pure sand, and early transplanting to larger containers after careful root pruning is recommended. Propagation by cuttings is also possible. Freshly collected seeds of *Haloxylon persicum* germinate readily in winter; they should be sown in tins of pure sand and covered lightly. The nursery should be within the area of the plant's natural habitat; cuttings can also be taken. *Hyphaene thebaica* seeds should be soaked in water for 2 weeks at room temperature until germination starts and then sown in deep containers of sand. No pretreatment is required for *Balanites aegyptiaca*, *Moringa aptera*, and *Nitraria retusa*. The variation in drought resistance of *Retama raetam* of different provenances indicates the importance of seed origin. *From author's summary.*

2161. Bauman, M. **Seasons of raising forest plants in nurseries.** *La-Yaaran* 2 (2), 1952 (36–7, 46). [Heb.e.]

Includes, for the main species grown in Israel, data on seed pretreatment, time of sowing, methods of transplanting and watering, quantities of seed needed to obtain 1000 plants, types of receptacle and number of seeds/kg. *From author's summary.*

2162. Podhorski, I. O platani i uzgoju njenih sadnica. **[Raising Planes.]** *Šum. List* 76 (10/11), 1952 (376–90). 11 refs. [Croat.f.]

Includes a stem analysis of one average *Platanus acerifolia*, 48 years old, from the mixed stands of Baranja where the species was introduced some 50 years ago. The specific gravity of wood of 13–15% moisture content was 0·502–0·541 and fuel value at 15% m.c. ca. 4100 cal./g. One kg. of (cleaned) seed contains up to 300,000 seeds. Germination % varies from 3 to 55, average 35. It was found that seeds covered by a thin layer of soil germinated with their cotyledons free from the husk, while seeds only pressed into the soil could not do so. Results of sowing and planting experiments carried out in a nursery in 1950 showed that soil hygroscopicity is of great importance, addition of up to 30% of charcoal being found beneficial. The seed covering should be either dry earth or sand. The best method of sowing is into spaces 1 cm. wide between tiles pressed into the soil. Out of 200 2-year seedlings 70% had only their main root, and the rest only locally branched laterals. The height of 1-year plants is 25–40 cm., of 2-year plants, 40–100 cm.; the length of the root is 20–30, and 50 cm., respectively. *P. acerifolia* plants were transplanted (1) whole, (2) with the roots cut to half length, and (3) with both stem and root cut to half length; the best results were obtained with (2).

2163. Bouček, B. Třešeň. **[*Prunus avium*.]** *Lesn. Práce* 31 (4), 1952 (154–6). [Cz.]

Recommends reintroducing *P. avium* as a common forest species and gives instructions for sowing and transplanting.

2164. **[Artificial regeneration of *Mitragyna ciliata*.]** *Rep. For. Adm. Nigeria 1950/51*, 1952 (22).

Experiments have been made in nursery technique for raising *M. ciliata*, a freshwater swamp species. Seed was sown both on raised beds with swamp litter or direct into scraped swamp soil. Both methods were successful, but the latter is probably the more economic. It is suggested that *Mitragyna* areas could be restocked by the establishment of focal points consisting of small bush nurseries constructed with a minimum of clearing and cultivation, from which the seedlings could be planted out direct.

232.321. Nursery Sites

2165. Vincent, G. Jak plošně uspořádat lesní školky. **[The lay-out of forest nurseries.]** *Lesn. Práce* 31 (5), 1952 (209–15). [Cz.]

According to Czechoslovakian standards, the area of nurseries should be at least 0·05% of the extent of the forests they serve. Permanent nurseries should have an area of 0·2–0·5 ha., the larger ones being laid out for mechanized cultivation methods. Beds are 1 m. broad and preferably 100 m. long. Paths between beds are 0·25 m. with a road of 2·5 m. terminating the beds and primarily used for turning the cultivator. A square or nearly square nursery is recommended.

2166. Kotešovec, V. Návrh nového tvaru lesní školky. **[Suggested new shape for forest nurseries.]** *Lesn. Práce* 31 (5), 1952 (231–5). [Cz.]

To permit mechanization in small and medium-sized nurseries, the author suggests adopting a circular shape, including a central portion of, say, 30 m. diameter for the turning of ploughs, and an annular area of any reasonable width. The latter would be bordered on both sides by roads 3 m. wide, the outer road having a fence and ditch outside. Another ditch would divide the inner road from the inner circular area. It is claimed that the shape suggested would reduce the area required for the turning of ploughs, and improve the microclimatic conditions by increasing the area shaded by the surrounding forest.

232.322. Preparation and Treatment of Soil, including Maintenance of Fertility

See also No. 1878.

2167. Wycoff, H. B. **Green manure crop causes seedling mortality.** *Tree Plant. Notes* No. 12, 1952 (9–10). [Mason State Nursery, Topeka, Ill.]

Red Pine sown immediately after the ploughing-in of a crop of cowpea and Sudan grass, suffered 64% mortality from damping off.

2168. Wycoff, H. B. **Methyl bromide controls soil organisms which cause mortality of Eastern White Pine seedlings.** *Tree Plant. Notes* No. 12, 1952 [11–4]. [Mason State Nursery, Topeka, Ill.]

Soil sterilization with MeBr before sowing *Pinus strobus* seed on green-manured plots [see preceding abstract], gave satisfactory control of damping off.

2169. Warcup, J. H. **Effect of partial sterilization by steam or formalin on damping-off of Sitka Spruce.** *Trans. Brit. mycol. Soc.* 35 (4), 1952 (248–62 + 1 plate). 16 refs. O.B.D.

A number of fungi were isolated from living *Picea sitchensis* seedlings growing in untreated plots at Old Ampthill Nursery, Beds., and the pathogenicity of isolates of *Cylindrocarpon radicicola* and of several species of *Pythium* and *Fusarium* was tested in the laboratory. Three species of *Pythium* were highly pathogenic to Sitka seedlings and caused a wide range of symptoms, depending on the moisture content of the soil. *P. ultimum* was generally the most virulent. Pathogenic *Pythium* spp. were abundant in the upper layer and rare in the lower layer of Ampthill nursery soil. They were absent from forest soils there. *Pythium* spp. were more abundant in old nursery soils than in new ones at Kennington Nursery, near Oxford. *P. ultimum* was abundant in soil from three alkaline nurseries, and rare or absent in soil from two acid nurseries. In experiments in partial sterilization of nursery soils at Ampthill, *Pythium* spp. did not survive either the initial steam or formalin treatment, and subsequent recolonization was slow. Formalin was toxic to *Pythium* spp. *Trichoderma viride* was often the dominant recolonizer of formalin-treated soil. Improvement in seedlings after steam or formalin treatment was marked in the first year and moderate in the second years. Little residual effect was observed in the third year. [Cf. *For. Abstr.* 13 (No. 3769).] *From author's summary*

2170. Edwards, M. V. **The effects of partial soil sterilization with formalin on the raising of Sitka Spruce and other conifer seedlings.** *For. Rec. For. Comm., Lond.* No. 16, 1952. pp. 20. 3 refs. Price 1*s.* 6*d.*

Summarizes 5 years' experimental work. [Cf. preceding abstract.]

2171. **Nutrition problems in forest nurseries.** *Rep. Rothamst. Exp. Sta. 1951*, 1952 (41–3).

'Partial sterilization' by steam and formalin has given outstanding success in the older nurseries [cf. *For. Abstr.* 13 (No. 3769); 14 (No. 283)]. The application of formalin suitably diluted, at the rate of 250 ml./sq. yd. a month or more before sowing, consistently improved growth in all experiments on neutral or moderately acid soils that had been used as nurseries for many years. There was also a beneficial effect in newer nurseries with very acid soils. Formalin destroys most of the common soil fungi, checks nitrification, and alters the numbers of many kinds of micro-organism for long periods. In some experiments it reduced the numbers of plants destroyed by cockchafers, and the numbers of eelworms on or round the roots of Sitka Spruce.

'Partial sterilization' increased the NH_3 contents of the field soils and the CO_2 production on incubation. After incubation, treated soils had much more NH_3 and less NO_3 than the untreated. Many of the effects observed in several nurseries and seasons, could be explained on the assumption that Sitka Spruce seedlings grow better with NH_3 than with NO_3, and it is possible that continued use of $(NH_4)_2SO_4$, together with the other fertilizers needed might restore some 'worn-out' nursery soils to productivity. Discoloration of the tips of youngest needles of Sitka Spruce following top dressings of N at midsummer has been identified as a symptom of K-deficiency. A yellow discoloration and hardening of the upper needles late in the season on plots with phosphate and K with late supplies of NH_3 has been identified as a symptom of Mg-deficiency and controlled by supplying either $MgSO_4$ or dolomite in preparing the seedbeds.

2172. Němec, A. Použití basických vyvřelin k melioraci degradovaných lesních půd. **[Use of basic igneous rocks for the improvement of degraded forest soils.]** *Zpr. výzkum. Úst. lesn. ČSR* No. 3, 1949 (32–74). 11 refs. [Cz.russ.e.]

Diabase and basalt dust (quarry waste) were used experimentally both in nurseries and in deteriorated forest stands. The addition of basalt dust to very acid sandy soil, equivalent to a layer of 1–3 cm. of dust, greatly improved the growth of Lime, Pine, and Ash plants in nurseries. The amount of K, Ca (and sometimes Mg) in the plants was increased, while that of P_2O_5 and SiO_2 decreased. When basalt (and diabase) dust was used in stands on degraded, acid, and poor forest soil (particularly on podzolized hard-pan soils) in a layer 1–2 cm. thick or 1–2 kg. per plant (hole-manuring), the improvement of growth after 4 years was considerable. Very good results were obtained with diabase dust applied to *Alnus glutinosa*. The effect of the basic rock dusts on mineral nutrition was similar to that observed in nurseries.

232.323. Sowing and Covering

2173. **Aids to germination.** *For. Res. India Burma 1947/48, Pt. II*, 1952 (40).

The following method adopted in the Kangra Forest Societies division (E. Punjab) to accelerate the germination of seed with hard testa was very successful. A sunken bed dug 1 ft. deep was thoroughly packed with *Adhatoda vasica* leaves and twigs. A raised seedbed ca. 6 in. thick was prepared on top of it and sown with seeds which were then covered with sand. Watering was done from above.

232.324. Transplanting and Lining Out, including Grading of Seedlings

2174. MADŽAREVIĆ, Ž. Plug za vađenje sadnica. **[A plough for lifting plants.]** *Šumarstvo* 5 (6), 1952 (519–20). [Serb.f.]

Illustrated description of a plough in which the share is replaced by 2 smaller shares 15–40 cm. apart and curved at the bottom so as to form the letter U.

2175. RUBŢOV, S. Clupa pentru măsurarea puieţilor in pepinieră. **[Calipers for measuring nursery stock.]** *Rev. Pădurilor* 67 (3), 1952 (24–5). [Rum.rum.russ.]

Describes the design and use of calipers [illustrated] invented by the author for measuring simultaneously the collar diameter and height of seedlings. The implement is scissor-shaped, with handles 60 cm. and 'blades' 20 cm. long. The 'blades' are brought together at the collar and locked in position, the height is read off a scale on the handles, and the caliper is then withdrawn and the diameter read in the locked position from a scale at the top of the handles.

232.325. Tending (in both Seedbeds and Transplant Beds)

2176. PRIDHAM, A. M. S. **Weeds of nurseries and landscape plantings.** *Proc. 6th ann. Ntheast. Weed Control Conf.* 1952 (283–9). O.R.E.

Presents instructions for the chemical control of *Alnus incana*, *Agropyron repens*, *Artemisia vulgaris* and *Stellaria media*.

2177. WOODRUM, H. G. **Grazing geese.** *Tree Plant. Notes* No. 12, 1952 (3–5).

A note on the use of geese to keep down weeds in forest nurseries in W. Virginia. White Chinese geese are used, as they are small and less likely to trample seedlings. They should be used only on 2 + 0 or large 1 + 0 stock. They appear to have a taste for Red Pine seedlings, but do not touch White, Scotch, Virginia, or Shortleaf Pines, Norway Spruce, Multiflora Rose, and Poplars.

232.326. Salvage of Overgrown Seedlings and Transplants (Root or Shoot Pruning etc.)

2178. FAULKNER, R. **Early observations on the root development of one-year-old Corsican Pine seedlings following root pruning.** *Scot. For.* 7 (1), 1953 (23–6).

At the Newton Forestry Commission nursery near Elgin, 3 standard beds of Corsican Pine were root-pruned in early spring, 1952. The object was primarily to test the efficiency of a sledge type of root pruner and secondly to observe the effect of root pruning on subsequent growth and survival. In early May of the same year 25 randomly selected plants from each root-pruned bed and a control bed were lifted and carefully examined. It was strikingly evident that root pruning promotes increased vigour in root-fibre production in the zone of soil above the point of root severance. Its possibilities to replace lining out as a nursery technique are discussed. *From author's summary.*

232.327. Protection Measures in Nurseries

See Nos. 2167–71, 2496.

232.328. Vegetative Propagation

See also Nos. 1938, 1940, 1946, 2007.

2179. IVANOVIĆ, M. Uticaj biljnih hormona na oživljavanje reznica šumskog i parkovskog drveća i šiblja. **[Effect of 'plant hormones' on the rooting of cuttings of forest and ornamental trees and shrubs.]** *Šumarstvo* 5 (3), 1952 (221–4). 5 refs. [Serb.f.]

Presents results of tests made in December 1951 on cuttings taken from one-year-old branches of 18 tree and shrub species. Proximal ends of the 20-cm. cuttings were dipped for 24 hours to a depth of 2 cm. in a 0·01% solution of α-naphthylacetic acid. From 10 to 15 cuttings of each species were treated, with an equal number as controls; results 5 weeks later were as follows: (1) no appreciable effect of treatment could be seen on *Pinus sylvestris*, *P. nigra*, *Spartium junceum*, *Euonymus europaeus*, *Morus alba*, and *Elaeagnus angustifolia*; (2) a weak effect was observed with *Taxus baccata*, *Amorpha fruticosa*, *Sophora japonica*, *Hibiscus syriacus*, *Euonymus japonicus*, and *Rosa canina*; (3) a good response was seen from *Ginkgo biloba*, *Fraxinus excelsior*, *Platanus orientalis*, *Laburnum anagyroides*; (4) the best response was from *Betula verrucosa* and *Populus nigra* var. *italica*. The criteria of the effect were: intensity of callus formation, number and length of roots, and time of their appearance.

2180. CHIBA, S. **[Preliminary report on promoting rooting of cuttings of 'Sugi' (*Cryptomeria japonica*) and Japanese Red Pine (*Pinus densiflora*) by preceding strangulation of the parent branch.]** *J. Jap. For. Soc.* 34 (10), 1952 (318–20). [Jap.e.]

Shoots of 4-year-old Pine were bound round with wire in May, 1949, and those of *C. japonica* in 1950, and both left until autumn 1951. Cuttings, taken from immediately below the swelling, were planted in the nursery in September. Results of observation after 1 year, given in a table with English legends, show that rooting of *C. japonica* was considerably, and that of *P. densiflora* slightly increased by the treatment.

2181. HYODO, M. **[Stem and root cuttings of *Robinia pseudoacacia* var. *umbraculifera* under bad conditions (poor site and no special tending).]** *J. Jap. For. Soc.* 34 (1), 1952 (18–21). 4 refs. [Jap.e].

The following results were obtained: (1) Rooting was 90% or over for stem cuttings above 10 cm. long

and 5–7 mm. diam. (2) The effectiveness of treatment with α-naphthalene sodium acetate increased with decreasing diameter of stem cuttings. (3) Rooting exceeded 90% for root cuttings 18 cm. long and over 4 mm. diam. (4) The greater the length and diameter of root and stem cuttings, the larger the resulting plant. *From author's summary.*

2182. HYODO, M. **[Root cuttings of *Robinia pseudoacacia* var. *umbraculifera* treated with 'rootone'.]** *J. Jap. For. Soc.* 34 (9), 1952 (279). [Jap.e.]

A rooting % of 89 was obtained for treated cuttings 10 cm. long and 3–6 mm. in diameter. *From author's summary.*

2183. SCHMITZ-LENDERS, B. Fuss-Steckling oder Setzrute bei der Pappelpflanzen-Anzucht? **[Shoot-base cuttings or setts in raising Poplars?]** *Forst u. Holz* 8 (1), 1953 (1–2). [G.]

Summarizes the advantages and disadvantages of cuttings without terminal buds (shoot-base cuttings) and setts.

2184. WECHSELBERGER. Fuss-Steckling oder Setzrute bei der Pappelpflanzenanzucht. **[Shoot-base cuttings or setts in raising Poplars.]** *Forst u. Holz* 8 (5), 1953 (60–2). [G.]

Comments on the article by Schmitz-Lenders. [See preceding abstract.]

2185. RUBŢOV, S. O metoda de butăşire orizontală cu butaşi foarte scurţi. **[The way to plant very short cuttings horizontally.]** *Rev. Pădurilor* 67 (4/5), 1952 (29–30). [Rum.rum.russ.]

An experiment was made in horizontal planting of very short (6–10 cm.) Poplar cuttings, (*a*) in trenches 4 cm. deep and (*b*) in trenches 8–10 cm. deep: (*a*) gave 46% and (*b*) 19% rooting.

2186. LANTZ, A. Knoppympning av tall. **[Bud-grafting Pine.]** *Skogen* 39 (12*), 1952 (136*). [Sw.]

Describes with illustrations the budding method for grafting Pine, a method particularly suitable for N. Sweden, where grafting material is often poor. At Sundmo 70% of grafts by this method were successful, and it seems promising for use both in the open and in the greenhouse.

232.329. Miscellaneous (including Greenhouses, Frames, Raising in Pots, Tubes etc.)

See No. 2192.

232.33. *Formation of Stands by Direct Sowing*

See also Nos. 2092, 2136, 2248, 2254.

2187. BLOMGREN, Y. Metsänviljelystöistä ja niiden tuloksista Tuomarniemen hoitoalueessa. **[Silvicultural experiments in the state forest district of Tuomarniemi, and their results.]** *Metsät. Aikak.* 1952 (5), (145–7, 142). [Fi.e.]

Slow-growing Spruce on poor soils has been replaced on more than 4000 ha. by young stands, mainly by clear-felling, burning over the felled area and sowing Pine seed on the snow crust. This method was successful on low-lying moist sites, but on poor rocky soils where the burning was too severe, further measures have been needed. Sowing in prepared patches was also very successful. Spruce stands are scarce, and have been damaged by cold. Naturally regenerated Birch is abundant in Pine stands on moist sites. *Larix sibirica*, *L. decidua* and *L. kurilensis* have done well, especially on better soils. The previous deficiency of younger stands has been overcome by these treatments, the composition of the forests being largely changed from Spruce to Pine and Birch. Increment is roughly double that at the beginning of the century. In 1950, 23 sample plots in stands artificially established were measured and the figures compared with those for natural stands. Results are tabulated, and show better dominant heights, volume and volume increment for the artificial stands.

2188. PARKER, J. **Establishment of Eastern Red Cedar [*Juniperus virginiana*] by direct seeding.** *J. For.* 50 (12), 1952 (914–7). 14 refs.

Direct sowing of *J. virginiana* on two different soils, showed no differences between soils, better survival under open than under closed canopy, and much better establishment where litter was removed than where it was left undisturbed.

2189. WOODS, J. B., and BEVER, D. N. **Progress report on the Cochran airplane seeding experiment.** *Res. Note Ore. Bd. For.* No. 10, 1952. pp. 10 + 5 photos + 2 gphs.

[Cf. *For. Abstr.* 14 (No. 1168).] Further observations do not materially alter the conclusions reached earlier.

2190. BEVER, D. N. **A summary of notes from ten experimental direct seeding plots established in the Cochran area from 1944 to 1947.** *Res. Note Ore. Bd. For.* No. 8, 1952. pp. 23 + 4 photos + 1 map.

Deals with *Pseudotsuga taxifolia* and *Chamaecyparis lawsoniana*, and gives results and costs (including rodent control). [Cf. *For. Abstr.* 14 (No. 1168).]

2191. TURČEK, F. J. K otázce ochrany zasiateho lesného semena pred hlodavcami. **[Protection of sown forest seeds from rodents.]** *Lesn. Práce* 31 (5), 1952 (215, 218–21). [Slovak.]

Mainly a general description of local mechanical (trap) methods for the control of the genera *Clethrionomys*, *Apodemus*, *Microtus*, *Arvicola*, *Pytimys*, *Citellus*, and *Sciurus*.

232.4. Formation of Stands by Planting

232.41. *Planting Stock (Type, Handling and Treatment)*

See also No. 2211.

2192. **Size of Teak stumps and comparison with *dona* (leaf-cup) plants and split stumps.** *For. Res. India Burma 1948/49, Pt. II*, 1952 (23).

Dona plants [cf. *For. Abstr.* 13 (No. 2077)] gave higher survival % and better height growth at 1 year than stumps of 0·7 in. diam. and less. Height growth of stumps of 0·8 in. diam. was better than that of *dona* plants and survival 81% compared with 91% for *dona* plants.

2193. MAGUIRE, W. P. **Some observations on the use of the transpiration inhibitor 'Plantcote' on lifted tree seedlings.** *Tree Plant. Notes* No. 12, 1952 (15–7). [State Nursery, Placerville, Calif.]

For the past 3 years small quantities of seedlings of *Pinus monticola, P. resinosa, P. lambertiana, Pseudotsuga taxifolia* and *Sequoia sempervirens* have been treated by dipping the tops and roots in a solution of one part Plantcote and 2 parts water, and subjecting them to warm air from the ventilator of an oil furnace until a shiny film was formed on the foliage. The seedlings were then packed in wood wool and the packages stored in a cold room with temperatures maintained near 38° F. Seedlings planted after 2 months had suffered no damage from drying out, and *S. sempervirens* 1 + 0 stock planted after 4 months suffered no early mortality. Plantcote is basically a vinyl-resin latex, to which other ingredients are added, and is manufactured by the B. F. Goodrich Chemical Co., Rose Building, Cleveland, 15, Ohio.

232.42. *Methods of Planting (including Use of Fertilizers etc.)*

See also Nos. 1865–6, 2172, 2199–2201, 2341.

2194. **[Use of ammonium sulphate to stimulate the growth of Teak stumps.]** *Rep. For. Dep. Sudan Jan. 1950–June 1951*, [1952?] (41).

In one experiment the results were inconclusive, and in the other, where the $(NH_4)_2SO_4$ was put in the planting holes in direct contact with the roots, severe scorching occurred and the results were decidedly adverse.

2195. Söderström, V. Tidsstudier vid skogsplantering. **[Time studies in forest planting.]** *Skogsägaren* 29 (1), 1953 (18, 20). [Sw.]

In a forestry course at the Torsta Forestry and Agricultural School, studies were undertaken by students using 9 different methods, planting 3-year plants in silty moraine soil with a thin humus layer and few stones, a soil typical of Jämtland. Of the 6 methods in which the humus was not removed, planting with the Strömbacka mattock took 355 ± 25 min./1000 plants, auger planting and T-planting with a spade 610 ± respectively 31 and 61 min., and 3 bar-planting methods 830–1110 min. Of 3 methods in which the humus was stripped off, planting in an open hole using a Mo-Do mattock took 1270 ± 90 min., and auger planting and bar planting in squares made with a Mo-Do mattock 1440 ± 70 and 1755 ± 134 min. respectively.

232.43. *Spacing and Arrangement in Plantations*

2196. Ralston, R. A. **Some effects of spacing on Jack Pine development after 25 years.** *Tech. Note Lake St. For. Exp. Sta.* No. 388, 1953. pp. 1.

Tabulated results of measurements of Jack Pine planted as 1 + 0 seedlings at spacings of 4 × 4, 6 × 6 and 8 × 8 ft. in 1925 show that the seedlings from the 6 × 6 plantings have developed best and are about ready for a light post or pulpwood thinning. The 4 × 4 seedlings are too small for commercial thinning and the 8 × 8 have developed orchard-like crowns.

2197. Taller, M. **Planting distances of Aleppo Pine trees in a forest.** *La-Yaaran* 3 (1), 1952 (29, 35). [Heb.e.]

Concludes, after discussing the merits of various spacings in relation to soil and climate, that 250 plants/dunum (giving a spacing of 2 × 2 m.) is preferable to either 80–100, or 400–450 plants/dunum. [1 dunum = 0·247 acre.] *From author's summary.*

233. *Afforestation*

2198. Weck, J. Ödlandaufforstung: eine Einführung in die Technik der Wiederbewaldung von verödeten Kahlflächen in den verschiedenen Klimazonen der Erde. Band I: Einführung zum Ödlandproblem — Heiden — Weiden — Mageräcker der Ebenen und Mittelgebirge der gemässigten Zone. **[Waste-land afforestation: an introduction to the technique of reforesting waste, cleared areas in the various climatic zones of the earth. Vol. I: Introduction, heathlands, pasture lands and poor agricultural lands of the plains and hills of the temperate zone.]** Fritz Haller Verlag, Berlin-Grunewald. 1952. pp. 104. Many refs. [G.e.] Price *DM.*8 [15*s.* 6*d.*]

This review, based on literature and the author's experience, is the first instalment of a projected work in 4 volumes. It deals with its subject under the following headings, each of which has its own bibliography and English summary: I—General ecological differences between forested and non-forested areas. II—Technique of afforesting waste land in the Central and W. European forest climax zone, with sections on the afforestation of heathland (Atlantic and dry E. European heaths) and of pasture land and upland heaths in the hills and lower mountains of Germany, and reviews of experience in afforestation work in France, the Netherlands and Belgium, Great Britain, and the U.S.A. A list is appended of the scientific, German, and English names of the tree species mentioned in text. The author stresses, throughout, the importance of proper measures for soil improvement and proper choice of species not only for the first (pioneer) but also for the following forest generation. Subsequent volumes will deal with dunes, peatlands etc. in the cool and temperate zone, rocky calcareous sites (e.g. karst) and steppes, and devastated lands in the tropics.

2199. Macdonald, J. A. B. **Thirty years' development of afforestation techniques on difficult ground types in south-west Scotland.** *Forestry* 26 (1), 1953 (14–21).

The development of ploughing, draining and planting, and the use of turfs and of phosphate is considered in detail for each of two main types. For *Molinia* lands, the 1952 technique secures adequate drainage and a very considerable turnover of turf, and here *Picea abies* and *P. sitchensis* remain the first choice. For *Calluna* lands, the development of methods and the choice of species are more difficult. The Spruces refuse to grow pure and unnursed on the poorer *Calluna* types, and the use of *Pinus sylvestris, P. contorta, P. mugo, Larix leptolepis*, and *Pseudotsuga taxifolia* is discussed. The main requirements for successful afforestation of these ground types are summarized. [Cf. *For. Abstr.* 14 (No. 1186).] *From author's summary.*

2200. Zehetmayr, J. W. L. **Problems of moorland afforestation.** *Quart. J. For.* 47 (1), 1953 (32–40). 7 refs.

[Cf. *For. Abstr.* 13 (No. 1179).] A review of progress in Britain with various techniques of drainage, cultivation and fertilizing on both peat bogs and heaths.

2201. Jansen, J. J. M. VAM-compost en heidebebossingen. **[VAM compost and heathland afforestation.]** *Ned. Boschb.-Tijdschr.* 25 (1), 1953 (16–9). [Du.]

A number of instances of improved growth obtained by applying a compost manufactured from city refuse are discussed. On adjacent plots 40 tons VAM compost or 500 kg./ha. basic slag were applied in 1933 before planting with Japanese Larch mixed with hardwoods and other softwoods. After 19 years the total production was 130 and 102 cu.m. and c.a.i. 6½ and 5 cu.m. respectively. The increased production for the compost-treated plot was estimated at Fl.45/ha./year or Fl.840 over 19 years. The compost at that time cost Fl.100/ha. and the basic slag Fl.15, while the figures now are Fl.300 and Fl.60 respectively. Even at present prices the use of the compost is very profitable. Douglas Fir and Norway Spruce planted on a site treated with 40 tons VAM compost/ha. in 1934 have reached a height of 8 m. On a corresponding site planted a year later after a preliminary crop of lupins and no compost, they had reached only 3 m. by 1948; in that year they were treated by scattering compost at a rate of 30 tons/ha. and by 1952 had reached a height of 6 m. The cost of the pre-cropping with lupin was Fl.200 and that of treating with compost Fl.250–300/ha. An analysis of VAM compost is given.

2202. Rejić, H. Obnova gozdov na slovenskem krasu. **[Forest regeneration in the Slovenian Karst.]** *Gozd. Vestn.* 10 (8/9), 1952 (247–52). [Sloven.]

Among the fast growing species tried are stands of *Pseudotsuga taxifolia* on the Pocivalnik near Postojno, and *Pinus strobus* near Bistrica (N.W. of Fiume). In Panovec, 40-year-old *Cedrus deodara* grows uncommonly well, in spite of rather unfavourable climatic conditions (excessive humidity and fogs); the history is given of work done in the Slovenian Karst since 1948 (when that region was incorporated into Slovenia). The main species planted on denuded soil are *C. deodara*, *C. atlantica*, *C. libani*, *Abies cephalonica*, 'Spanish Fir' [*Abies pinsapo*?]; *Cedrus* is planted together with *Cupressus pyramidalis* and some hardwoods, while Firs are mixed with different hardwoods (Sycamore Maple, Ash, Limes, Walnuts, Red Oak); trial plantings of *Abies borisii-regis* have also given good results. Good growth was obtained when *Salvia* and *Spartium* were sown without cultivation on very poor sandy soils. The trials with *Juglans nigra*, *J. sieboldiana*, and *Sophora* were successful. *Pinus strobus* is sown in the spring, after soaking the seeds in rain-water for 14 days. It has been found that Beech plants develop well whether the roots are pruned or not. The plants can be cut back to 2–3 cm. above the collar. Wild Mulberry is another species planted. Crow-bars are now used instead of pick-axes for making holes in the rock; the increase of efficiency attained is 300%.

2203. Giperborejski, B. Vrste drveta za pošumljavanje krša Dalmacije. (Zapažanja iz prakse.) **[Tree species for the afforestation of the Dalmatian karst. (Observations from practice).]** *Šum. List* 76 (10/11), 1952 (390–400). [Croat.g.]

Discusses the following species: *Pinus nigra*, *P. halepensis*, *Cupressus sempervirens*, *Cedrus deodara*, *C. atlantica*, *Robinia pseudoacacia*, *Tilia* spp., *Ulmus* spp., *Celtis australis*, *Juglans regia*, *Amygdalus communis*, *Corylus* spp., *Ailanthus altissima* and *Rhus typhina*.

2204. Chapman, G. W. **Afforestation techniques in Cyprus.** *Unasylva* 6 (4), 1952 (160–5).

2205. Avnimelech, M. **Some geological problems in the afforestation of the pleistocene sandy areas on the coastal plain of Israel.** *La-Yaaran* 2 (2), 1952 (29–31, 48–9). [Heb.e.]

Describes the 3 geological groups found in the sandy areas, and concludes that planting should be done first in the group of weathered loamy sand containing mesolithic flint elements, and in the other groups later, after suitable species have been determined. *From author's summary.*

2206. Muhammad, K. **A note on the afforestation of shifting sand dunes area in the Thal (desert) area of the Punjab.** *Pakistan J. For.* 2 (4), 1952 (276–9).

Root and shoot cuttings of *Calligonum* spp. and *Calotropis procera* are recommended for dunes, where canal water is not available for basin irrigation. Plants recommended for preliminary stabilization of banks of water-courses and irrigation channels are *Phragmites karka*, *Saccharum munja*, *S. spontaneum* and *Ricinus communis*; once these are established, trees can be planted. Notes are given on the success of the species used in this way. A mixture of *Dalbergia sissoo*, *Albizzia* spp., *Morus alba*, *Prosopis spicigera*, *Acacia arabica*, and *Melia azedarach* is recommended for the Thal plantations, and *Bombax malabaricum* for planting along all water-courses and main irrigation channels.

2207. Allen, J. C. **A half-century of reforestation in the Tennessee Valley.** *J. For.* 51 (2), 1953 (106–13). 27 refs.

Includes reports on the performance of the 6 species that have been most used for planting on eroded sites—*Robinia pseudoacacia*, *Liriodendron tulipifera*, *Pinus echinata*, *P. taeda*, *P. virginiana*, and *P. strobus*.

2208. Deitschmann, G. H., and Lane, R. D. **Forest planting possibilities on Indiana coal-stripped lands.** *Tech. Pap. Cent. St. For. Exp. Sta.* No. 131, 1952. pp. 57 + 21 photos, drawings and dgms. + 3 gphs. + 1 map. 35 refs.

Sections include: a review of literature; a study of the extent and nature of areas affected; and a study of natural forests and of plantations on opencast sites. A study of various environmental factors in older plantations showed that: (1) Acidities above pH 4·5 caused a decrease in Pine growth rate, and were probably even more harmful to hardwoods

which were, however, scarce in the sample plantations. (2) Trees showed a noticeable reduction in growth on the upper slopes of higher banks only where these were sandy-textured. (3) In most areas the banks were well stabilized and erosion injury to established trees was restricted mainly to banks exceeding 65% in slope. Under Pine/hardwood stands, especially those containing Black Locust, abundant litter and ground vegetation gave good protection against erosion; slight erosion was found in Black Walnut stands but few trees were noticeably affected. Thinning at 18–20 years is recommended, especially in dense Pine plantations; trees 18–20 years old, at a rate of about 200/acre, can be pruned to 17 ft. to ensure a clean butt log. Some experiments to determine suitable species and the value of Black Locust as a nurse crop are described; they are too recent to provide conclusive results. Planting guides for the Wisconsin and Illinoian glaciated and for the unglaciated regions in Indiana are given.

2209. Limstrom, G. A. **Effects of grading strip-mined lands on the early survival and growth of planted trees.** *Tech. Pap. Cent. St. For. Exp. Sta.* No. 130, 1952. pp. 35. 22 refs.

Discusses literature and describes experiments on development during the first 3 years of a number of tree species and the moisture conditions on (*a*) levelled, (*b*) unlevelled parts of 4 experimental areas. Survival on 18 of 24 sites was often considerably higher for (*b*); on the other 6 it was a little higher for (*a*). Height growth, however, was consistently better on (*b*), which also had better moisture conditions during the summer of 1948; (*a*) areas were found to dry out more rapidly in drought and to become more saturated in wet weather than (*b*). On coarse-textured banks in areas that have neither frequent prolonged drought nor excessive rainfall, differences in survival and growth were negligible; but on clay banks in areas with extreme variation of rainfall, survival and growth proved significantly better on (*b*).

235. *Underplanting, Advance Planting etc. Nurses and Formation of Mixtures. Interplanting of Inferior Growth*

See also Nos. 2092, 2553.

2210. Finn, R. F. **Foliar nitrogen and growth of certain mixed and pure forest plantings.** *J. For.* 51 (1), 1953 (31–3).

Investigations were made in two forest areas and three spoil-mound plantations. Some species showed greater total height and foliar N when associated with tree cover than on old fields and bare spoil. Of the cover species investigated, *Robinia pseudoacacia* was superior to all others in increasing foliar N and stimulating growth. Its beneficial effects are due, in part at least, to its ability to improve soil N conditions. Of the species studied, *Liriodendron tulipifera* and *Prunus serotina* made the greatest response to the improved soil-N conditions provided by *R. pseudoacacia.*

2211. Jacob, M. C. **Regeneration of the Bonsum [*Phoebe goalparensis*]—Amari [*Amoora wallichii*] forests of Assam.** *Indian For.* 78 (12), 1952 (602–8). 4 refs.

Gives a brief history of the regeneration techniques employed at different times in these tropical evergreen forests. The method now in use as a result of experiments is as follows: (1) large, merchantable trees are removed, but without creating large gaps in the dominant canopy; (2) a general shrub-cutting is carried out before the rains; (3) towards the end of the rains in September, lines 4 ft. wide are cut straight through the area and planted during the cold weather. Nurseries are formed in advance under cover near the future planting site and the planting stock is 'hospitalized'. 'Hospitalization' consists in pruning the nursery stock of all side branches and leaves, digging them up and tying in bundles, and heeling in in loose sand in a pit kept permanently moist under shade for 2–4 weeks so that they may recover from the shock and grow new root hairs. They are then planted out in the forest. The results of this technique are very satisfactory, mortality not exceeding 5%.

2212. Soedibja, R. S. Penjelidikan tentang tumbuh dan ekologi kaju besi (*Eusideroxylon zwageri* T. et B.) di lingkungan hutan Semandai (Palembang). [**Investigations on the growth and ecology of *E. zwageri* at Semandai, Palembang.**] *Rimba Indonesia* 1 (5), 1952 (215–23). 4 refs. [Jav.e.]

One-year seedlings were planted between 1921 and 1926 at 2-m. intervals down the middle of strips 5 m. apart and 1½–2 m. broad, running N. and S., cleared in second-growth forest. Gradual exposure to sunlight as the seedlings increase in size does no harm, but too much light, and especially exposure immediately to full sunlight, check growth and the seedling may die. Results, which are tabulated with English legends, show that upper height increases with the depth of the clay/iron pan and that the slope of the ground also affects height growth. *From author's summary.*

236. *Care of Regeneration or Plantations in the Initial Stages of Establishment (including Regeneration Surveys)*

See also Nos. 2101–2.

2213. Holt, V. **Weed growth in plantations.** *Sylva, Edinb.* No. 33, 1952 (19–20 + 1 photo).

Describes a bracken-crusher that can be drawn by horse or tractor, between the rows of young plantations. It consists of a heavy, 4-sided casting, 3 ft. 4 in. long, which revolves and is fitted with 4 blades at the angles 6 in. apart, each blade extending the full length of the casting. It has also been used effectively against brambles in Natal. [Cf. *For. Abstr.* 11 (No. 3261).]

2214. Weatherell, J. **The checking of forest trees by heather.** *Forestry* 26 (1), 1953 (37–40).

Experiments on podzolized heather moor at Allerston Forest have shown that a heather mulch applied round checked *Picea sitchensis*, *P. abies*, and *Chamaecyparis lawsoniana*, or more simply the elimination of living heather by surface hoeing, produces improved colour and vigour of the trees. It has also been demonstrated that the addition of a nitrogenous fertilizer to checked Sitka Spruce can,

at least temporarily, alleviate the condition of check. *From author's summary.*

2215. BEVER, D. N. **The relationship of stocking per cent to number of trees per acre on artificially seeded areas.** *Res. Note Ore. Bd. For.* No. 9, 1952. pp. 9 + 1 gph.

Presents a curve that can be used to convert from milliacre stocking % to number of trees/acre on areas of Western Oregon that have been artificially re-stocked by broadcast sowing of Douglas Fir. [Cf. *For. Abstr.* 14 (No. 1195).]

237. *Amelioration of Forest Sites*

See also Nos. 1867, 1882, 2172, 2198–2201, 2214, 2248, 2346.

2216. HARTMANN, F. Waldbodenmelioration als Mittel zur Produktionssteigerung. **[Forest soil improvement as a means of increasing production.]** *Öst. Vjschr. Forstw.* 93 (4), 1952 (209–18). [G.]

Discusses the use on different site types of fertilizing with lime or organic material, of green manuring, of burning over the site and of cultivating the soil.

2217. ELSÄSSER, A. Technik und Wirtschaftlichkeit der Waldkalkung in Österreich. **[The technique and economics of liming in Austrian forests.]** *Öst. Vjschr. Forstw.* 92 (3), 1951 (154–61). [G.]

Discusses the cultivation needed to mix lime with the soil, the value of lupin cultivation in conjunction with liming, and the different mechanical methods, especially the use of a forced-draught blower, of spreading the lime in mountains; gives estimated costs for Austria, and actual costs, considerably lower because of transport conditions, for Bavaria.

2218. AFANASIJEV, D. Ekspresne šume. (Metodika podizanja brzorastucih šuma.) **[Fast-growing forests. (Methods of raising fast-growing forests).]** Seljacka Knjiga, Sarajevo. 1952. pp. 277 + 6 gphs. 69 refs. [Croat.croat.e.russ.] Price *Din.*360 [+ 40%].

Cf. *For. Abstr.* 14 (Nos. 309–10).

2219. BEARD, J. S. **The use of fertilisers in Wattle cultivation.** *J. S. Afr. For. Ass.* No. 22, 1952 (9–33).

Describes an experiment laid out in 1936 to test the efficacy of various fertilizers applied to young Wattle plantations. Superphosphate was the most successful, the greatest benefit being derived when it was dug in within the first 6 months of the trees' life.

2220. **[The use of organic fertilizers in *Cassia siamea* plantations.]** *Rep. For. Adm. Nigeria 1950/51*, 1952 (32).

Night soil and slaughter-slab offal were put into trenches between rows of *C. siamea* 6 ft. apart on very poor land. Six months after treatment the trees were 15 ft. high compared with 2 ft. for untreated plots.

238. *Timber Plantation Crops requiring Special Treatment*

See also Nos. 1993, 2230, 2534–5.

2221. WETTSTEIN, W. Die Pappelkultur. **[Poplar cultivation.]** *SchrReihe öst. Ges. Holzforsch.* No. 5, 1952. pp. 52. 22 refs. [G.]

Contains chapters on: the economic importance of Poplar; choice of site; cultivation; propagation; breeding; planting; description of species; and pests.

2222. SCHMITZ-LENDERS, B. Pappelprobleme. **[Poplar problems.]** *Forst u. Holz* 8 (2; 3), 1953 (13–20; 29–32). [G.]

Consists mainly of notes on the following points: (1) the 'Harff' strain of Poplar (*Populus regenerata* 'Harff'), its properties, silvicultural characters, growth and performance, with description of stands illustrating various points of interest; (2) growing Poplar for sawtimber; (3) growing Poplar for pulpwood; (4) growing Poplar outside the forest (i.e. in pasture etc.); and (5) selective breeding of Poplar.

2223. HOUTZAGERS, G. De populier in het landbouwbedrijf. **[Poplars on agricultural land.]** *Landbouwk. Tijdschr., Wageningen* 64 (10), 1952 (712–20). [Du.e.] A.P.B.

Discusses the value of additional timber production to the economy of the Netherlands, makes recommendations on choice of species and culture, gives some figures of price/cu.m. for *P. gelrica*, *P. serotina* and *P. marilandica*, discusses the merits of line plantations along fields and roadsides and the best form of shelter plantations for the Netherlands, and urges experiments and a careful examination of the effect of shelterbelts on crops.

24. TENDING OF STANDS AND TREES

2224. ERTELD, W. Vorratsbehandlung und Ertrag im Wald. **[Treatment of growing stock and yield in the forest.]** Deutscher Bauernverlag, Berlin 1952. pp. 88. 33 refs. [G.]

A brief summary by an adherent of 'quasi-natural' forestry, and with reference to German conditions, of the classical theory and practice of thinning as evolved chiefly for pure even-aged stands, and—in general terms only—of the development and implications of 'growing-stock tending' (Krutzsch's *Vorratspflege*), the aim of which is to produce and maintain uneven-aged groupwise mixtures of species and races adapted to the site, with optimum growing stock as regards both quantity and quality. Though implying the abandonment of clear felling, the latter does not bind the silviculturist to any one silvicultural system.

242. *Thinnings*

See also Nos. 2101–2, 2543, 2554.

2225. **[Thinning studies in Western White Pine.]** *Rep. Nth. Rocky Mt. For. Range Exp. Sta.* 1952 (14–5).

Data are tabulated showing the effect of thinning once (in 1914), twice (in 1914 and 1924) and 3 times (in 1914, 1924 and 1934) on stand composition and on diameter growth of cominant and co-dominant trees. Other measurements on a stand thinned at 45 years confirm that thinning in young stands should be light and frequent, for best results.

2226. CHAPMAN, H. H. **Effects of thinning on yields of forest-grown Longleaf and Loblolly Pines at Urania, La.** *J. For.* 51 (1), 1953 (16–26).

2227. Williamson, M. J. **Young Virginia Pine responds to thinning and pruning.** *J. For.* 51 (2), 1953 (129).

Recommended treatment, as a result of studies, is to select crop trees at about 10 years old, prune them to a height of ca. 8 ft., and release them to allow a 3- to 4-ft. space between crowns. About 7 years later the second 8 ft. should be pruned, and crop trees once more released.

2228. Cutten, E. Y. **The effect of neglected thinning in a sample plot in close spaced Corsican Pine in Kaingaroa State Forest.** *For. Res. Notes N.Z. For. Serv.* 1 (4), 1951 (11–2).

Stand condition in 47-year-old stands was directly related to past thinning treatment, varying from very poor with one light thinning to fair with two moderate thinnings. Three or four moderate to heavy thinnings would have been needed to produce a satisfactory stand at 47 years.

2229. S[chaeffer], L. L'éclaircie forte de Bregentved. **[Heavy thinning [of Oak] at Bregentved.]** *Rev. for. franç.* 1952 (12), (815–8). 4 refs. [F.]

Comparison of the results at Bregentved with those of a similar type of thinning at Bellême. [Cf. *For. Abstr.* 13 (No. 4101).]

2230. Hilf, H. H. Kann man Pappelbestände durchforsten? **[Can Poplar stands be thinned?]** *Repr.* from *Holz-Zentralblatt, Stuttgart* 1952 (59). pp. 5. 14 refs. [G.g.]

Hybrid Black Poplars are physiologically ill adapted to make use of extra growing space provided by thinning. Any thinning will involve loss of increment: early thinning involves little loss but will usually not pay; thinning just before crown closure leaves a long period before the crowns can use the extra growing space; and with late thinning they will never fill the space available. Thus, unless prices for pulpwood should ever justify the raising of close, unthinned stands, the initial spacing must be wide enough to eliminate the need for thinning.

2231. Lancaster, P. C. ***Sarcocephalus* [*diderrichii*] plantations at Akilla.** *Inform. Bull. For. Dep. Nigeria* No. 1, 1952 (1–2).

The plantation was grown with closed canopy to the age of 30 years and then thinned. This has allowed typical second-storey species to come in, and the final crop will resemble rich natural forest. If thinning is done earlier than this, the plantation is invaded by fast-growing light-demanders of little commercial value.

243. *Opening of the Canopy (Increment, Overhead Release and Improvement Fellings)*

2232. Reynolds, R. R. **Are suppressed Pines inferior?** *Sth. Lumberm.* 185 (2321), 1952 (182–3).

Fifty stumps showing evidence of early suppression were selected at random and measured. Their average diameter growth rate was found to have trebled after release at about 40 years. Most of the timber from these trees when felled was of good quality.

2233. Huckenpahler, B. J. **Ax or poison.** *Sth. Lumberm.* 185 (2321), 1952 (180–2).

Release was carried out in Mississippi on a dry slope-and-ridge site on 9 quarter-acre plots of hardwoods underplanted 8 years earlier with ca. 1200 Loblolly Pines/acre. On 3 plots, an average of 62 hardwood saplings/acre, d.b.h. ranging from ½ to 3½ in., were cut and NH_4 sulphamate crystals put on the freshly cut surfaces; 146 trees/acre over 3½ in. in diameter were poisoned by notching and putting 1 tablespoonful of crystals in the notch. On 3 plots, 103 saplings ½–3½ in. d.b.h. were cut but not poisoned, and 133 larger trees/acre were girdled with a single-hack frill. The last 3 plots were left untreated. The girdled trees died more slowly than the poisoned trees, but 2 years after treatment deaths from girdling exceeded those from poisoning. Poisoned trees, however, had less coppice regrowth than girdled trees. In the 2 years after release, diameter growth of Pines was twice, height growth 1½, and b.a./acre nearly 3 times that of controls. There was little difference in diameter, height and mean b.a./acre of trees released by poisoning and by girdling, but diameter growth of the 100 tallest Pines released by girdling, was significantly better than that of the tallest released by poisoning. Many Pines were damaged by 4- to 8-in. hardwoods breaking at the point of girdling or notching. Costs and hours of labour for girdling and poisoning were $3·60 and 4·8 hr. and $8·38 and 7·3 hr. respectively.

2234. Bramble, W. C., Worley, D. P., and Chisman, H. H. **Control of Scrub Oak (*Quercus ilicifolia*) and associated woody species with foliage and basal sprays.** *Proc. 6th. ann. Ntheast. Weed Control Conf.* 1952 (303–10). 2 refs. O.R.E.

Single foliage sprays did not give effective control. Basal dormant sprays of 2,4,5-T in oil eliminated woody plants where thorough coverage could be given to each plant. Where large stems could be treated by directive spraying, planted Pine were safely released but general spraying of brush with oil sprays killed most of the planted White Pine. Species such as Aspen and Sumac, which sucker from the roots, were controlled by two dormant basal sprays of 2,4,5-T in oil. *Quercus ilicifolia* was effectively killed back by dormant basal sprays of 2,4,5-T in oil, two sprayings being enough to release planted Pine. *From authors' summary.*

2235. Hackett, D. P. **Experiments in the chemical control of hardwoods in northeastern forests.** *Proc. 6th ann. Ntheast. Weed Control Conf.* 1952 (311–9). O.R.E.

Presents the results of applications of 2,4-D and 2,4,5-T alone and in mixture on a large number of hardwood species.

2236. Grano, C. X. **Effectiveness of Ammate [ammonium sulphamate] in controlling hardwoods.** *Sth. Lumberm.* 185 (2316), 1952 (44 . . . 50).

Results of experiments on Red Oak in S.E. Arkansas are discussed. Where quick release of Pine reproduction was essential, 10·7% Ammate solution applied in frills gave satisfactory results. Ammate crystals or pellets (3 × ½ in.), applied in cups at the ground line, eliminated sprouts almost

completely and satisfactorily killed trees up to 9 in. d.b.h. With advanced Pine regeneration 3 ft. or more high, where quick release was not necessary, frilling alone did the job cheaply; frilling and girdling in May of Red Oaks up to 10 in. d.b.h. was as effective as treatment using Ammate, but frilling in November was less so. Small hardwoods were effectively treated with the Cornell tool, using a solution of 4 lb. Ammate/1 gal. water. One jab of the tool on 1-in., and two on 2-in., trees is recommended. Applying Ammate crystals in cups at 30 in. above ground gave poor results.

245. *Tending of Trees, Pruning etc*

See also No. 2227.

2237. Dubois, L. Émondoirs à marteau. [**Pruning chisels.**] *Bull. Soc. for. Belg.* 60 (2), 1953 (104–9). [F.]

The author describes a pruning chisel (illustrated by scale drawings) weighing only 1·6 kg. (or 0·75 kg. in a yet lighter model) with removable blade, which he has developed from the tool used by the Union Allumettière. [Cf. *For. Abstr.* 10 (No. 2590).]

2238. Cosens, R. D. **Epicormic branching on pruned White Fir [*Abies concolor*].** *J. For.* 50 (12), 1952 (939–40).

2239. **Pruning and debudding.** *Rep. B.C. For. Serv. 1951*, 1952 (29). [Forest Experiment Station, Cowichan Lake.]

One hundred and twenty 10-year-old Douglas Fir trees, 3–10 ft. high, were pruned of all living branches except those up to 2·5 ft. above ground-level, and the lateral buds from the terminal cluster were removed. An average time of 25 seconds was needed to disbud each terminal cluster, making a total time, inclusive of pruning, of 50 seconds for a 3-ft. to 4 minutes for a 12-ft. tree.

Analysis of the variance in a 2-series sample of (*a*) 40 treated and (*b*) 40 normal trees indicated that: (1) the length of leader one year after treatment was significantly less (14·3%) on (*a*) than on (*b*); (2) the mid-diameter of leaders was the same on (*a*) and (*b*); and (3) the mid-diameter increment of the previous year's leader was significantly less (16·7%) on (*a*) than on (*b*). On trees 10–12 ft. high the upper part of the stem had to be severely bent over in order to disbud, and in one growing season had not recovered its original straightness. The branch habit of the top whorl left after pruning showed a marked tendency to sweep upwards at a point 2 in. from the bole [cf. *For. Abstr.* 13 (No. 3841)]. Current shoots, both lateral and leader, produced larger and more succulent needles than on normal trees. The denser foliage on the terminals of treated trees was more heavily infested with Adelges, and stripping of the needles at the time of disbudding caused insolation injury.

2240. Mackenzie, J. M. D. **Disbudding Scots Pine.** *Scot. For.* 7 (1), 1953 (11–4). 5 refs.

Thirty-four Scots Pine in a 7-year-old plantation were disbudded for 3 years, by which time the tops were out of reach. This produced up to 5 ft. 9 in. of wood clear of knots. It is suggested that by taking big trees only and starting a year or two earlier, 7 ft. of clear wood could be obtained. The operation would be financially justifiable only if the price of clear wood covered the increased costs. *From author's summary.*

25. TREATMENT OF DEFECTIVE, DERELICT OR VERY OPEN STANDS

See also No. 2552.

2241. Penistan, M. J. **The improvement of woodlands in Dumfries and Galloway.** *Forestry* 26 (1), 1953 (5–13). 1 ref.

Describes how rehabilitation has proceeded by co-operation between owners, foresters, and the Forestry Commission, and what modifications of silvicultural practice have been adopted to overtake the arrears of management resulting from the pre-war depression and from extensive wartime felling. *From author's summary.*

2242. Garfitt, J. E. **The rehabilitation of devastated woodland [in England].** *Forestry* 26 (1), 1953 (28–32 + 2 photos). 3 refs.

The paper discusses in detail the methods being employed to restore productivity quickly and economically to 1200 acres of privately owned woodlands, mostly hardwoods, from which all timber 12 in. girth and over had been removed during the war. *Author's summary.*

26. FORESTRY IN AGRICULTURAL AND PASTORAL AREAS (INCLUDING SHELTERBELTS AND THEIR TREATMENT)

261. *Alternate Forestry and Agriculture, Periodic or Temporary Agricultural Use of Forest Land*

See Nos. 2131, 2866.

262. *Fuel and Fodder Forests*

2243. Snook, L. C. **Tree Lucerne.** *Leafl. Dep. Agric. W. Aust.* No. 2013, 1952. pp. 6.

It is suggested that Tree Lucerne (*Cytisus prolifera*) could be grown to supply green fodder during late summer in W. Australia. It is hardy, relatively free from pests, grows on a wide variety of soils and is self-perpetuating if the seedlings are protected. The foliage is of high food value (analyses given), comparing favourably with ordinary lucerne, and so palatable that the trees need some protection from grazing animals. Methods of establishing and utilizing Tree Lucerne are discussed.

264. *Farm Forests*

See also Nos. 2221–3.

2244. Malsch, F. W. De wisselwerking tussen land- en bosbouw. [**The interaction of agriculture and forestry.**] *Landbouwk. Tijdschr., Wageningen* 64 (10), 1952 (705–11). [Du.] A.P.B.

Gives some figures of areas under timber production and of numbers employed in forestry in the Netherlands and discusses the production and use of timber by farmers, the value of forestry in preventing erosion and the effect of single lines of trees on agricultural crops.

2245. Miloševič, M. Iz seljačkog pošumljavanja u Srbiji. **[Afforestation on farms in Serbia.]** *Šum. List* 76 (9), 1952 (303–11). [Serb.f.]

In S. Serbia some rural afforestation work has been done since ca. 1918. The farmers use mostly wildings or plants from their own small nurseries. Main species are: *Robinia pseudoacacia* and *Ailanthus altissima* on dry sites, *Populus* and *Salix* spp. on flooded lands and along roads and paths. Interest in Poplar and Willow is increasing, as both can be used for structural timber and Willow for baskets.

265. *Strips or Lines at Road, Rail and Canal Sides etc; Hedgerow Trees*

See also Nos. 2221–3, 2244.

2246. Arief, O. S. M. Pohon² pelindung djalan. **[Trees for road-side planting.]** *Rimba Indonesia* 1 (3), 1952 (111–48). 2 refs. [Jav.e.]

Discusses factors affecting the choice of species and lists 20, both native and exotic, suitable for use, giving their distribution, a description of the tree, notes on propagation and likelihood of insect attack, and a discussion of the wood and its properties.

266. *Shelterbelts, Windbreaks*

See also Nos. 1901, 2006, 2223, 2244.

2247. Hilf, R. B. 110 Jahre Windschutzstreifen auf dem Westerwald. **[110 years of shelterbelts on the Westerwald.]** *Forstarchiv* 22 (7/8), 1951 (101–6). 14 refs. [G.]

Shelterbelts, mainly of Spruce, were established on the Westerwald (450–600 m. above sea level) from 1840 after heavy fellings for ironworks had left the area exposed to wind. More recent developments (area under shelterbelts in the 1920s, species, and breadth of belts now preferred) and research on shelterbelts in other countries are discussed.

2248. Antipov-Karataev, I. N., and Kraevoĭ, S. Ja. Ob ulučšenii lesorastiteljnyh uslovii na Ergenjah v celjah uspešnogo primenenija metoda gnezdovyh posevov duba. **[Improvement of conditions for forest growth in the Ergeni Hills with a view to successful use of the 'nest' sowing method for Oak.]** *Počvoved.* 1952 (7), (595–610). 10 refs. [Russ.] A.P.B.

Preliminary observations made at the Arshan'-Zel'man experimental station (S. of Stalingrad; in the semi-desert zone, with light-chestnut soils having a tendency to solonets formation, and hot dry winds in summer) in trials of 1–2 years' standing, indicate chiefly that: (1) Agricultural cover crops used on the interspaces between Oak shelterbelt sowings should not be planted nearer than 1–1·5 m. to the Oak, or the latter will suffer from their competition. (2) Owing to snow catching by their stubble, such crops increase the survival of Oak seedlings through their first winter. (3) Oak sown in 'micro-depressions', e.g. shallow trenches 10–25 cm. deep and 1 m. or more wide, showed better growth and higher survival through the first winter, than sowings on the flat.

Trials have been started with sowings made in a system of shallow trenches fed by collecting drains from the intervening ground, so as to utilize summer downpours to irrigate the tree seedlings; species trials are also being made.

2249. Collins, P. E., and Hansen, H. L. **Suppression effects in twenty-five-year-old windbreak plantings.** *Minn. For. Notes* No. 14, 1953. pp. 2.

Examination of a number of shelterbelts in Minnesota showed that American Elm, on account of its spreading habit, should not be planted in mixture with Pines, which it will suppress. Green Ash can be planted with Pine at a spacing of 16 ft. but not closer.

2250. Satoo, T. **[Notes on the water relations of trees in windbreaks.]** *Misc. Inform. Tokyo Univ. For.* No. 9, 1952 (26–30). 13 refs. [Jap.e.]

In a study carried out during the winter when N.W. winds prevail, in windbreaks consisting of 18-year *Chamaecyparis obtusa* in single rows running N.–S. and E.–W., measurements were made of transpiration, water content of needles and evaporation from wet blotting paper to windward and to leeward. Evaporation and transpiration were higher to windward except when the lee side was directly exposed to solar radiation. Water content of needles was always lower on the windward than on the lee side. It was concluded that wind reduces the water content of needles, but the effect on transpiration was less clear.

2251. Mařan, B., and Lhota, O. Mikroklimatické studie o výparu v ovzduší. **[Microclimatic studies on evaporation.]** *Lesn. Práce* 31 (5), 1952 (198–206). [Cz.cz.]

Investigations by the authors at Obřistvi in Bohemia [season and duration not specified], using Piché and Ron evaporimeters, have shown that: (1) On calm days, the evaporation curve roughly follows the temperature curve; in July, evaporation reached 11·5 mm. per day, rising to 13·7 mm. on windy days. (2) Cloudy sky and a wind of varying velocity cause irregular changes in the evaporation rate; at lower temperatures, wind becomes the governing factor. (3) The day-night evaporation amplitude reaches its peak with cloudless sky. (4) Maximum evaporation occurred at a height of 200 cm., the evaporation rate falling steadily as the height changed from 200 to 20 cm. (5) In the zone from the soil surface up to 200 cm., evaporation was greater above bare soil than above field crops. (6) Evaporation within a 35 m.-wide Pine shelterbelt without a shrub storey was less than in the open; it reached, however, 10·6 mm. on July days, apparently because of strong currents within the belt; during a S.W. wind blowing at right angles to the belt, evaporation in the open near the belt was: on the S. side 13·7 mm.; to the W., 13·0 mm.; on the N. side, 11·3 mm.; and to the E., 8·0 mm. [Cf. *For. Abstr.* 13 (Nos. 3849–51).]

268. *Pastured Forests. Grazing on Forest and Open Ranges. Forage Plants etc.*

See also Nos. 2365–7, 2372–3, 2529.

2252. Arnold, J. F. **Effect of heavy selection logging on the herbaceous vegetation in a Ponderosa Pine forest in Northern Arizona.** *J. For.* 51 (2), 1953 (101–5). 4 refs.

Observations over a period of 5 years after heavy selective cutting, indicate that the beneficial effect of canopy opening on herbaceous ground flora is more than cancelled by mechanical damage, accumulation of slash etc. The effects are particularly detrimental to the more valuable perennial grasses.

2253. PETERSON, R. A. **Comparative effect of seed treatments upon seedling emergence in seven browse species.** *Res. Note Nth. Rocky Mt. For. Range Exp. Sta.* No. 114, 1953. pp. 11. 5 refs.

The species were *Cornus stolonifera, Purshia tridentata, Ceanothus sanguineus, C. velutina, Amelanchier alnifolia, Prunus demissa* and *Acer glabrum.* Five treatments were used and recommendations are made for the different species on the basis of results.

27. ARBORETA. ARBORICULTURE FOR ORNAMENTAL PURPOSES. HEDGES AND HEDGE PLANTS

2254. CASTILLO LUSSICH, C. DEL. Posibilidades de difundir el género *Pinus* en el Uruguay. **[Possibilities of disseminating Pine in Uruguay.]** *Silvicultura, Uruguay* 2 (2), 1952 (5–50). Numerous refs. [Span.span.e.]

Describes two collections of *Pinus* in Uruguay: (1) part of the Lussich Forest in Punta Ballena, Maldonado, and (2) the Pinetum 'Nicasio del Castillo', which was formed by the author near (1). Experiments in direct sowing of several species of Pine have so far met with success. The methods are described. A list of species in the two arboreta is presented, with notes on nomenclature, origin, silvicultural requirements and uses.

28. HUSBANDRY OF FOREST PRODUCTS OTHER THAN WOOD

See also section 89.

281. *Christmas Trees*

2255. BRAMBLE, W. C., and BYRNES, W. R. **Effect of time of shearing upon adventitious bud formation and shoot growth of Red Pine grown for Christmas trees.** *Progr. Rep. Pa. agric. Exp. Sta.* No. 91, 1953. pp. 6.

Tests have indicated that Red Pine should be sheared for Christmas-tree production in early summer when height growth is still in progress. Shearing in late summer, autumn or winter produced trees of inferior form.

282. *Bark Crops*

See also Nos. 2094, 2150, 2219.

2256. RADIMIR, D. O mogućnosti uzgoja plutnjaka (*Quercus suber*) u našim krajevima. **[Possibility of growing *Q. suber* in Jugoslavia.]** *Šum. List* 76 (8), 1952 (255–63). [Croat.g.]

The natural range of *Q. suber* falling totally within that of *Q. ilex*, indigenous to some parts of Jugoslavia, the possibility is discussed of grafting it on the latter to obtain hardy trees capable of producing cork.

283. *Fruit and Seed Crops*

2257. SOKOLOV, G. A. Lesnye sady Tavridy. **['Forest orchards' of the Crimea.]** *Priroda, Moskva* 41 (6), 1952 (88–97). [Russ.] A.P.B.

An illustrated description of the Crimean 'forest orchards', i.e. areas in the Crimean mountains covered by mixed stands in which Oak, Hornbeam, Pine, and Beech, are mingled with fruit trees such as *Cornus mas, Pyrus communis, Pyrus malus, Crataegus* sp., *Prunus avium, Corylus avellana, Rosa canina, Sorbus* [*domestica*?], *Juglans regia, Prunus persica, P. armeniaca* (the last two, and probably also Walnut, being planted by man).

2258. BLASS, H. **Selection and preparation of site for planting Carob trees (*Ceratonia siliqua*).** *La-Yaaran* 2 (2), 1952 (31–2, 48). [Heb.e.]

2259. BLANK, S. DE. **A reconnaissance of the American oil palm *Elaeis melanococca* (Gaertner (em. Bailey)) = *Corozo oleifera* (Giseke) *Alfonsia oleifera* (H.B.K.).** *Trop. Agriculture, Trin.* 29 (4/6), 1952 (90–101 + 5 plates).

Botanical and silvicultural characters of this wild species, studied from the point of view of its possibilities as a plantation crop, and the likelihood of obtaining crosses with *E. guineensis.*

284. *Crops Tapped for Exudations*

See also Nos. 2907 *et seq.*

2260. DUDIĆ, M. Smolarenje u Srbiji i problemi u vezi sa njime. **[Resin-tapping in Serbia and related problems.]** *Šumarstvo* 5 (3), 1952 (185–91). [Serb.f.]

Spruce has not yet been tapped commercially, tapping in Serbia being limited to the following Pines (figures in brackets give the % of stems over 25 cm. d.b.h. for each species): *Pinus nigra* (81%), *P. leucodermis* (10·3%), *P. sylvestris* (7%), and *P. peuce* (1·7%). In state forests, 371,670 stems are being tapped, with 507,826 faces. The French system was found unsuitable for Serbian conditions, and the German method of narrow or half faces was adopted instead. A new adze was developed in Serbia, enabling the German method to be used while obtaining the smooth faces of the French. It is being introduced into commercial tapping, and is claimed to be suitable for both low and high, right-handed and left-handed tapping. In commercial long-term tapping, the minimum diameter is 25 cm. d.b.h. and the face width 10 cm., the total face widths adding up to 8–21% of the circumference. Yield per face averages ca. 400 g., maximum 1059 g., per season.

2261. RADIMIR, D. Smolarenje stimulacijom. **[Resin-tapping with stimulating agents.]** *Šum. List* 76 (1/3), 1952 (42–50). 14 refs. [Croat.f.]

Includes the results of investigations in Serbia on the use of (1) 25% HCl, (2) ditto with $MgCl_2$ (1 kg. per 10 litres), and (3) ditto with $CaCl_2$ (1·19 kg./10 litres) for stimulating resin production of *Pinus nigra.* The solutions were sprayed on faces in quantities equivalent to ca. 2 kg./ton of resin produced. All three stimulants were effective, (3) more than (2), and (2) more than (1). French, Austrian, and German tapping methods were used. Similar tests

conducted in June–August 1949 on Spruce stems, gave the following resin yields: controls, 358 g.; (1), 433 g.; and (3), 580 g. per tree.

2262. David, R. L'activation du gemmage modifie-t-elle la vitalité du pin maritime? **[Does the chemical stimulation of resin flow impair the vigour of *Pinus pinaster*?]** *Bois & Résin.* 33 (1573–1575), 1951 (1; 1–2; 1); 34 (1576), 1952 (1, 3). [F.]

A preliminary account of research being carried out at Caudos in the Landes on this question, vigour being measured by diameter and height growth. The conditions of the study are discussed and the data presented in detail. One factor to be taken into account is the marked excentricity of most of the trees in this area, the annual rings usually being wider on the eastern than on the western side of the tree. The general conclusions reached so far are as follows. (*a*) Radial growth is diminished in the region immediately above the face, but this diminution is almost the same for all methods of tapping, with and without acid spraying. (*b*) Acid treatment does not increase the number of resin canals in the affected area, but does increase their diameter. (*c*) Wood 1·4 m. and more above the face is apparently unaffected by acid spraying. It therefore appears that the acid absorbed at the face is not transported by the wood tracheids. (*d*) Height growth and elongation of branches appear to be no more affected by acid treatment than by simple tapping. Further investigations are in progress.

2263. Orlov, I. I. Za dliteljnuju podsočku sosny. **[Protracted tapping of Scots Pine.]** *Lesn. Prom.* 11 (3), 1951 (28–9). [Russ.]

Contrary to conclusions arrived at by Besser and Sinickiĭ [see *For. Abstr.* 13 (No. 3865)], the author believes, on the basis of experience in various parts of the country, that protracted tapping is suitable for *P. sylvestris* in the U.S.S.R. It is true that the descending-face system of protracted tapping gives low yields, but much better yields are obtained when using the ascending-face system or the method suggested by the author (see below). The following figures give the yield in g./face for the descending-face, ascending-face, and the author's method: (1) in Western Siberia—417·1, 553·8, 560·6; (2) Belorussia —241·0, 356·0, 398·0; (3) Southern Urals—289·5, —, 469·8. The author's method is described in a schedule for a tree of 30 cm. d.b.h., increasing 2 cm. in diameter every 6 years. The tapping is conducted for 4 periods of 5 years each, with 3 one-year rest periods. Two faces 9 cm. wide are started for each 5-year period, up to a height of 1·75 m. The annual yield per face amounts to ca. 380 g. during the first 3 periods, and 350 g. during the last period. The total yield per tree in 23 years is 14·9 kg., compared with 10·3 kg. in 8 years for the short-period broad-face tapping method.

2264. Mazek-Fialla, K. Die wissenschaftlichen Grundlagen der Harzgewinnung. **[The scientific bases of resin-tapping.]** *Zbl. ges. Forst- u. Holzw.* 71 (1/2; 3), 1949–51 (20–54; 221–37). 158 refs. [G.g.e.]

A review, based partly on literature and partly on the author's own studies with Scots and Austrian Pine, stressing the frequent divergences in the past between research results and those attainable in practice—arising both from disregard by the researcher of practical conditions, and from neglect or misapplication by the practitioner of research results. The author's main conclusions, checked in practice, include the following: (1) For Scots Pine, maximum resin yield per single tree is given by 'Viennese' freshenings—rather narrow furrows cut with the *Wiener Hobel* [cf. *For. Abstr.* 8 (No. 2657)], and wide, flat superficial freshenings are unsuitable. For Austrian Pine, however, the latter method is superior to most narrow-furrow methods, though there are indications that as good or better yields may prove to be attainable with 'Viennese' freshenings. (2) Except in unfavourable (dry) weather, the interval between freshenings should not exceed 6–7 days, nor should it be less than 3 days as rule. Some elasticity must be left for variation according to age of trees, site quality and weather. (3) In practice, shallow freshenings give as high yields as deeper cuts, provided that suitable freshening intervals etc. are selected, and are preferable in that they cause less damage to the wood and involve less work. (4) Ascending give higher yields than descending freshenings even, in the long run, for Scots Pine. (5) The most advantageous angle between the freshening and the vertical, as regards both yield and work involved, appears to be 40°. (6) In section, the most advantageous form of furrow for freshenings on Scots Pine is a smooth curve (shown diagrammatically) forming at its base a narrow, even drainage channel for the resin. This form gave yields ca. 30% higher, on the average, than other forms of furrow. (7) Though, in theory, narrow faces should be more productive than broad ones, the use of two or more narrow faces instead of one of normal breadth did not give any greater yield. For Austrian Pine, with its long tapping period, two faces per stem should be worked in turn (*not* simultaneously), their breadth to be less than $\frac{1}{2}$ the girth. For Scots Pine, one face should be used, its breadth to be between $\frac{1}{2}$ and $\frac{2}{3}$ of the girth of the tree. Working two faces simultaneously on different sides of the tree is justified only in tapping to death in a short period. (8) Modern freshening tools such as the *Wiener Hobel*, properly used, cause far less injury to the wood than the older method of tapping.

2265. Schmied, H. Die Werkzeuge der Lärchenharzung. **[Tools and equipment used in tapping Larch for resin [in Austria].]** *Mitt. forstl. VersAnst. Mariabrunn* No. 46, 1950 (42–66). 3 refs. [G.]

2266. Clements, R. W. **The bark hack—techniques of using this efficient method.** *Naval Stores Rev.* 62 (42), 1953 (12–3, 27–8).

How to train tappers who are used to making the old type of freshening streak.

2267. Perkitny, T., and Kryczko, M. Wpływ żywicowania na podatność surowca sosnowego do wyrobu sklejek. **[Effect of resin-tapping on the suitability of Pine wood for plywood manufacture.]** *Sylwan* 93 (3/4), 1949 (94–105). 1 ref. [Pol.pol.e.]

One reason for Pine being less suitable for plywood than hardwoods is the presence of resin which (1)

'sweats' during hot pressing and (2) imprisons any water present in the veneers, thus causing blisters. The object of the investigation was to determine whether tapped trees gave less suitable plywood than untapped trees. It was found that (*a*) butts of tapped (German face) stems yielded much inferior peeler logs; the greatest resistance to peeling was found in the outermost layer, and tapped logs peeled as easily as untapped ones once the outer 3 cm. had been removed; the life of a peeling knife, however, was 20% shorter with tapped logs. The logs from above the tapped area peel no differently from logs of untapped trees (all information on point (*a*) was based on mill experience, which was confirmed by hardness and compression tests); (*b*) glue-line shear strength for veneers from tapped logs was about 10% less; (*c*) in 10 out of 12 test series the tensile strength of plywood (whether along, across, or at an acute angle to the face veneer fibres) was lower in the case of tapped raw material, by an over-all average of 16%.

2268. Obmiński, Z. Wstępne badania nad introdukcją trzmieliny brodawkowatej (*Evonymus verrucosa* Scop.) w środowisku boru sosnowego. **[Preliminary investigations on the introduction of *E. verrucosus* into Pine forests.]** *Sylwan* 96 (4), 1952 (473–88). 17 refs. [Pol.]

Presents preliminary results of an investigation on the natural conditions for the future growing of *E. verrucosus* for gutta percha, particularly in the Pine site types common in Poland. The investigation, started in 1952, is planned to last until 1957. It has been found that *E. verrucosus* has considerable ecological plasticity. Apart from the *Pineto-Quercetum fruticosum*, where it occurs wild, it is likely to do well in *Pinetum vacciniosum*, less well in *Pinetum dicranosum*, and still less in *Pinetum cladoniosum*. The survival of transplants depends largely on their general vigour; young plants of *E. verrucosus* regenerate their damaged root systems easily, irrespective of site conditions. Drought, particularly in spring, is dangerous for young transplants; their light requirements are moderate.

287. *Bamboo and Cane Growing etc.*

2269. McClure, F. A. **Bamboo in Latin America.** *Turrialba* 2 (3), 1952 (110–3). 2 refs. [E.span.] A.P.B.

Domestically, the most important species in Latin America is *Guadua angustifolia*, though this is rarely found outside Colombia and Ecuador. Other *Guadua* spp., however, and at higher altitudes *Chusquea* spp., are put to a variety of uses elsewhere. Exotics, such as *Bambusa* and *Phyllostachys*, are limited to small-scale plantings; *B. vulgaris* is probably the most widely cultivated. Notes on the suitability of Bamboo for pulping are presented. An experimental planting of *B. vulgaris* in Guatemala for this purpose is now in its fourth year.

2270. Gupta, J. N. S. **Cultivation of Bamboos in West Bengal.** *W. Bengal For. Bull.* No. 1, 1952. pp. 10 + 6 photos + 6 drawings. 12 refs. Price *As.*12 (1*s.* 3*d.*).

General descriptions of the Bambuseae, propagation and tending methods, exploitation, and notes on 12 species considered suitable.

3. HARVESTING OF WOOD, LOGGING AND TRANSPORT. RATIONALIZATION OF WORK; WORK STUDIES. FOREST ENGINEERING

31. LOGGING AND TRANSPORT: GENERAL

2271. KOROLEFF, A. **Logging mechanization in the U.S.S.R.: a review of Russian data.** *Woodl. Res. Index Pulp Pap. Res. Inst. Can.* No. 90 (*B*–1), 1952. pp. 158. 111 refs. Price $5·00.

The review (covering machinery, labour and management, and techniques) is based on about 100 technical articles published since 1947 in *Lesn. Prom.* with a few references from *Unasylva*. Translations and full abstracts of some 20 papers from *Lesn. Prom.* are included.

2272. EKLUND, R. Voidaanko kuitupuun hankintaa yksinkertaistaa ja mekanisoida. **[Is it possible to simplify and mechanize the logging of pulpwood?]** *Tied. Metsäteho, Helsinki* No. 84, 1953. pp. 10. 4 refs. [Fi.e.]

Describes an American mechanized pulpwood-logging operation and considers its value in Finnish conditions.

2273. WEITZMAN, S. **Mountain logging.** *Sth. Lumberm.* 185 (2321), 1952 (199–202).

Makes recommendations based on experience in the Fernow Experimental Forest, W. Virginia, on planning and constructing a system of skid roads and on the choice of equipment for felling and hauling.

32. FELLING AND RELATED OPERATIONS

323. *Felling and Subsequent Primary Conversion*

See also Nos. 1865, 2271–3, 2296–2300, 2662.

2274. PASTUSZYŃSKI, F. Działalność Zakładu Ścinki i Wyróbki Zrębowej. **[Activity of the Section of Felling and Initial Conversion [of the Forest Research Institute, Warsaw].]** *Sylwan* 96 (3), 1952 (373–6). [Pol.]

A short account of its main activities since its inception in 1948.

2275. ARNST, A. **Timber up the hill.** *Amer. Forests* 58 (12, Pt. 1), 1952 (6–9).

Describes a method of logging developed by the Weyerhaeuser company. The felling area is first cleared of large fallen timber and the trees are then felled uphill, being pulled over by a tractor-mounted double-drum winch after the normal undercut and back-cut have been made. The method is said to save much breakage of logs. [Cf. *For. Abstr.* 13 (No. 3023).]

2276. BACKMAN, O., and WINNLERT, E. **Lumbering saws and saw research at the Sandvik steel works [, Sweden].** *Z. Weltforstwirt.* 15 (3), 1952 (111–4). [E.g.f.]

Describes methods and equipment used in designing logging saws and testing their efficiency.

2277. SINGER, A. Der Eulerzahn, eine vergessene Zahnform? (Erfahrungen in Bayern 1939–1950). **[The Euler saw-tooth, a forgotten tooth form? (Experience in Bavaria, 1939–50).]** *Forstarchiv* 21 (7/9), 1950 (99–102). [G.]

Describes and illustrates the 'Euler-Hochleistungszahn DSP', a special M-shaped tooth patented in the early 1930's, and gives figures in support of the claim that it is more efficient in cross-cutting than the other tooth patterns in use in Bavaria.

2278. DOUDA, V. Studie výkonnosti motorových řetězových pil používaných v naší lesnické praxi. **[Efficiency of motor-driven chain saws used in Czechoslovak forest practice.]** *Zpr. výzkum. Úst. lesn. ČSR* No. 3, 1949 (170–91). [Cz.russ.e.]

Results of a preliminary investigation are tabulated and graphed.

2279. **[A new chain saw—the 'Sawette'.]** *J. For.* 50 (11), 1952 (894).

Hoffco Inc. of Richmond, Ind., have announced a new chain saw, the 'Sawette', which will cut trees and other plants 6 in. in diameter. It enables the operator to cut level with the ground while standing upright. Weighing 26 lb. it has a 2-h.p. engine, concentric bowl float feed carburettor, 1-quart petrol tank, 12-in. tempered spring steel blade bar, $\frac{1}{8}$-in.-pitch chisel tooth, and 32-in. saw chain.

2280. RANDEL, W. C. **Cutting characteristics of different power saw chain designs.** *Quart. Bull. Mich. agric. Exp. Sta.* 35 (2), 1952 (219–29).

2281. TROËNG, I. Motorsågkedjor, deras arbetssätt och konstruktion. **[Power-saw chains, their action and construction [with appendices by C. Skoglund and S. Söderlund on research on saw teeth in a pendulum apparatus].]** *Medd. SkogsforsknInst., Stockh.* 41 (8), 1952. pp. 41. 2 refs. [Sw.e.]

Describes an investigation on the cutting ability and power consumption of different saw chains with varying chain speed and feeding force, and on the effect on sawing of the type of tooth, its cutting angle, and the construction of the guide plate. There is a full English summary and results are shown in graphs and tables, most of which have legends in both English and Swedish.

2282. USPENSKIĬ, V. A. Pilenie drevesiny tverdolistvennyh porod električeskimi pilami. **[Use of electric saws on hardwoods.]** *Lesn. Prom.* 11 (9), 1951 (10–3). [Russ.]

When using the VAKOPP electrical chain-saw on hardwood timber (90% Oak, 10% Ash with admixture of Sycamore Maple, Lime, and Elm), it was found that the optimum value of the front bevel angle for the thicker stems (Oak 36–38 cm., other species 28–30 cm. d.b.h.) was 50–55°, while the best top bevel angle was found to be 40–45°. The height of the raker teeth was reduced by 1–1·2 mm. It was found that cutting efficiency depended on both species and stem diameter, the maximum (in sq. cm./sec.) being obtained for the diam. range 15–25 cm. For higher diameters the sawyers usually change the angle of the saw quite frequently in order to reduce the length of cut. Cutting efficiency, however, falls

for diameters (length of cut) less than 15 cm. The optimum length of cut depends on: (1) chain design, (2) motor construction and characteristics, (3) thrust exerted on the saw during sawing, (4) nature of tooth-bevels, and (5) mechanical properties of the wood. Experimental and observed results are explained theoretically.

2283. PUTKISTO, K. Puutavaran kuorinnalle ja siirrettäville kuorimakoneille asetettavista vaatimuksista ja eräitä kuorimakonetyyppejä. **[Barking timber and portable barking machines.]** *Metsät. Aikak.* 1952 (10; 11), (267–9; 303–9). [Fi.e.]

Describes with illustrations a number of American, Canadian, Swedish and Finnish machines.

2284. PUTKISTO, K. Puutavaran kuorinnista ja siirettävistä kuorimakoneista. **[Barking timber and portable barking machines.]** *Tied., Metsäteho, Helsinki* No. 73, 1952. pp. 6. 3 refs. [Fi.e.]

Discusses the choice of site for barking timber and describes, with illustrations, Finnish and Swedish barking machines.

2285. **Speedy log barking.** *Timb. Tr. J.* 203 3978), 1952 (1659).

A further description of the Swedish 'Skoglund' machine. [Cf. *For. Abstr.* 13 (No. 3876).]

33. DEGREE OF UTILIZATION AND WASTE. CLEARING THE FELLING SITE

See also Nos. 1865–6.

2286. MERRICK, A. M., and MARTINELLI, M., JR. **Calculation of volume of hardwood logging waste.** *J. For.* 50 (11), 1952 (824). 2 refs.

A study of logging waste in Indiana hardwoods resulted in the deduction of a formula $VR = 2{\cdot}44 + 0{\cdot}0484\ (D) - 0{\cdot}0090\ (H) - 3{\cdot}65\ (MR)$, where VR = ratio of total volume to merchantable volume, D = d.b.h. in inches, H = merchantable height in feet, and MR = 'merchantability ratio' (merchantable % of total height). The three independent variables were found to rank, in decreasing order of importance, MR, D, H. About 90% of the logging waste was found to be in tops and slightly less than 10% in stumps.

2287. MOLTESEN, P. Kalkuler over produktionen av affaldstræ for perioden 1950–1970. **[Estimate of wood-waste production for 1950–1970.]** *Repr.* from *Træindustrien, København* 2 (11), 1952. pp. [6]. [Dan.]

Tabulates estimated figures, based on actual figures over the last 4 years, for production of forest waste suitable for firewood and of wood waste in the industries converting home-grown timber, both arranged by species and districts.

2288. SIGMOND, J. Pařez jako přirozený pluh lesa. **[The stump as the natural forest plough.]** *Čsl. Les* 31 (18), 1951 (399, 402–4). [Cz.]

In the author's experience, Pine stands regenerated by sowing or planting on a clear-felled site from which all stumps have been extracted, show, after several years, much better growth on ground not affected by the stump extraction. This is probably due to the successive settling of the loose soil in the stump holes and to their decreasing aeration. On the other hand, when stumps are not extracted, better growth of trees and plants is observable near the decaying stumps. He recommends leaving the stumps, because they act as accumulators of soil moisture, regulators of microclimate, and suppliers of various nutrients; but to prevent beetle infestation they should be coated with a wood-tar preparation.

2289. REINHOLD, M. Forstgerechtes Roden: eine Einführung in die Rodetechnik und eine Anleitung zur Rodearbeit. **[Correct stump removal: an introduction to technique and working processes in stump clearing.]** Gesellschaft für forstliche Arbeitswissenschaft, Reinbek [bei Hamburg]. 1951. pp. 114. 52 refs. [G.]

A practical instructional booklet for woodcutters and foresters, giving the results of work by 'Gefa' to devise methods acceptable from both economic and silvicultural points of view. Each method is described comprehensively, with illustrations and details of requirements in tools and machinery, labour and draught horses, materials, and working processes involved. There are sections on manual grubbing, pulling out with mechanical equipment, pulling the whole tree over so that its fall accomplishes most of the work of stump extraction, and blasting with explosives. Miscellaneous notes are appended on: splitting stumpwood with explosives; the stump-extractor's workshop; unusual methods of extraction (vertical pulling with the 'Greifbagger' machine and a special technique of stump blasting); and Spruce and Pine stumpwood for the manufacture of fibreboards.

2290. THOMSON, J. M. **Reclaiming cut-over woodland.** *Scot. Agric.* 32 (3), 1952/53 (117–20 + 2 photos). O.R.E.

Stumps from 54 acres of felled heavy timber, mainly hardwood, were removed by means of explosives, piled and burned. The operations, including levelling, draining, cultivation and sowing, are described. Costs per acre of stump removal and disposal and levelling slightly exceed £79.

35. RATIONALIZATION OF WORK. WORK STUDIES

See also Nos. 2195, 2276 *et seq.*, 2289.

2291. HILF, H. H. Internationale Probleme der Arbeitsgestaltung in der Forstwirtschaft. **[International problems relating to development of working techniques in forestry.]** *Z. Weltforstwirt.* 15 (3), 1952 (83–92). 84 refs. [G.e.f.]

Discusses the theory of research on forest work, and conditions to be observed.

2292. SCHÖNWIESE, H. Die forstliche Arbeitslehre in Österreich. **[The science of forest work in Austria.]** *Z. Weltforstwirt.* 15 (3), 1952 (92–5). 31 refs. [G.e.f.]

Gives a brief historical review of studies on techniques of forest work.

2293. LEIJONHUFVUD, A. C. Die Organisation und Tätigkeit der forstlichen Arbeitsstudienabteilungen in Schweden. **[The organization and activities of sections studying forest work in Sweden.]** *Z. Weltforstwirt.* 15 (3), 1952 (95–9). [G.e.f.]

Lists the organizations concerned and summarizes the subjects covered in the fields of logging and transport.

2294. KILCHENMANN, H. R. Erfahrungen beim Einführen rationeller Waldarbeit in der Schweiz. [**Swiss experience in rationalizing forest work.**] *Z. Weltforstwirt.* 15 (3), 1952 (104–7). [G.e.f.]

Discusses the use of training and propaganda, and the improvement of tools.

2295. ARO, P. Vereinheitlichung der Zeitverteilung in den forstlichen Zeitstudien. [**Standardization in the distribution of time in forest work studies.**] *Z. Weltforstwirt.* 15 (3), 1952 (100–1). [G.e.f.]

Discusses the distribution of time and the terminology used in Finnish work studies.

2296. PLATZER, H. B. Leistungsuntersuchungen mit der Iltis-Axt. [**Performance studies with the 'Iltis' axe.**] *Allg. Forstzeitschr.* 6 (27/28), 1951 (291–3). [G.g.]

Work studies showed that this axe (weight 775 g.) did an equivalent job in the same number of strokes as the local Harz axe (1000 g.). Further studies [axe unspecified] gave the number of strokes made by a 2-man team in felling and trimming Spruce. Using these figures, an attempt is made to express the advantage of the Iltis over heavier axes in terms of 'm./kg.' [no. of kg. lifted through 1 m.] per 2-man team per working day, tabulated against mean volume per tree removed. Local prejudice exists against the shape of the Iltis, but the Harz axe could be made to Iltis weight if the same superior steel were used.

2297. DANEK, Z. Analiza bezpieczeństwa pracy w leśnictwie. [**Analysis of work safety in forestry.**] *Bezpieczeństwo i Higiena Pracy, Warszawa* 3 (2), 1949 (6–8). [Pol.] L.S.

Includes the following data, based on pre-war [Polish?] observations, per 100 accidents in forestry work: (1) *Type of job:* trimming, 24; skidding, 21; felling, 16; cross-cutting and transport in the forest, 14; roads and quarries in forests, 12; cultivation, 5; barking, 4; minor forest products, 4; (2) *Part injured:* Hand, 25; feet, 16; shins, 11; knees, 10; chest, 8; shoulders, 7; head, 6; eyes, 5; back, 4; trunk, 1; other parts of the body, 7; (3) *Month of occurrence:* January, 10; February, 7; March, 9; April, 6; May, 7; June, 11; July 12; August, 10; September, 6; October, 6; November, 7, and December, 9; (4) *Time of day:* 6–7 a.m., 2; 7–8, 5; 8–9, 9; 9–10, 12; 10–11, 12; 11–12, 14; 12–1 p.m., 8; 1–2, 6; 2–3, 7; 3–4, 11; 4–5, 10; and 5–6 p.m., 4.

2298. HILSCHER, A. Die Erschwerung der Arbeitsleistung im Hauungsbetrieb durch Ästigkeit und Hackstand. [**Increased difficulty in logging operations caused by branchiness and the felling position.**] *Z. Weltforstwirt.* 15 (3), 1952 (101–4). [G.e.f.]

Tables are given showing increased payments calculated for special difficulty caused by branching and felling position. Factors considered in calculating the allowance for branching are its extent (crown length/stem length), distance between branches and diameter of branches. The table is for Spruce but tables for other species can be drawn up by comparison. The allowance for felling position is based on the slope of the site, because of the increased time and energy used in moving round the tree for barking, trimming and cross-cutting and the necessary reduction in power when swinging an axe on sloping sites.

2299. HILSCHER, A. Vorgang bei der Aufstellung von Richtlinien für die Leistungsbestimmungen unter Berücksichtigung mathematischer Erkenntnisse. [**The establishment of guides for determining performance using methods based on mathematical knowledge.**] *Öst. Vjschr. Forstw.* 92 (3), 1951 (202–24). [G.]

Discusses the establishment of piece rates for felling from time studies, with allowances for special difficulties (e.g. sloping sites and branchiness). [Cf. preceding abstract.]

2300. BENTZ, F. Erstellung einer Betriebsleistungstafel für die Waldarbeit im Hügelland und in der Ebene auf Grund der Lohnstatistik. [**Preparation of a production table for forest work on hilly ground and in the plains based on wage statistics.**] *Öst. Vjschr. Forstw.* 92 (3), 1951 (234–9). [G.]

Discusses, with examples, a method based on available statistics for calculating piece-work rates for felling and barking different assortments and size classes by workers of different degrees of skill and experience.

37. TRANSPORT

See also Nos. 2271–3.

2301. BOČKO, N. A., and PERFILOV, M. A. Rabota na lesozagotovkah v nočnoe vremja. [**Night work on felling sites.**] *Lesn. Prom.* 11 (10), 1951 (4–10). [Russ.]

An illustrated description of lighting installations on felling sites, enabling skidding and loading at the forest depot to be done at night. In accordance with a Soviet standard (GOST 3825–47), the illumination near winches and electric (transformer) stations should be 1 lux, that required for the coupling, uncoupling, and loading of tree-length and other logs should be 0·5 lux, while in other places (auxiliary equipment) an illumination of 0·2 lux is sufficient. Theoretical considerations and practical experience both show that best results are obtained with floodlights; the floodlight projector used in the U.S.S.R. has a power of 1000 watts (220 volts), and weighs 23 kg. Three projectors of this type (and a fourth for use in foggy weather) are fixed to a frame that can be rotated round a vertical axis at a height of 20 m. on a pole erected near each TL-3 winch. The current is taken from the transportable electric station (40–60 KW.) supplying power to the winches. When skidding is done with tractors the low-power station supplying energy to power saws cannot serve as an efficient source of lighting current. The places where tree-length logs are bundled can be illuminated by the rear lamps of the tractor (for this purpose, a second lamp, rotatable like the standard lamp, is attached to the rear of the tractor cabin). In addition, the working position of each choker-operator should be illuminated by two 500-watt lamps suspended at a height of 8–10 m. Working positions in the forest depot are illuminated with

200- to 500-watt lamps suspended also at 8–10 m. height.

372/377. *Land Transport*

See also No. 1865.

2302. KARAVAEV, V. I. Pogružatelj s razdvižnymi fermami. [**Loader with provision for adjustment of the distance between its girder arms.**] *Lesn. Prom.* 11 (8), 1951 (18–20). [Russ.]

Illustrated description of a loader capable of lifting 1·5 tons; girder distance can be adjusted between 80 and 270 cm., thus enabling logs of different length to be loaded.

2303. GULIŠASVILI, B. G. Lotok-lesospusk s gidravličeskoĭ tjagoĭ. [**Log flume with hydraulic traction.**] *Lesn. Prom.* 12 (4), 1952 (16–8). [Russ.]

Describes a flume constructed in 1950 in the Caucasus, built of softwood planks, the bottom being 75 cm. wide, and the sides 30 cm. high. The gradient varied between 0·053 and 0·200 (average 0·104), and the flume was curved for $\frac{1}{3}$ of the total (2·2 km.) length. The logs, up to 90 cm. diam., were carried in 6–12 cm. of water, the average speed being 20 km./hour for a water depth of 10 cm. In describing the dynamics of the flume, the author points out that the water admitted to it serves a triple purpose: (1) hydraulic push which is added to the forward component of the weight of the log, (2) hydraulic brake operating when the velocity of the log exceeds that of the water, and (3) lubricant.

2304. KUSTER, A. Über Luftseilbahnfragen. [**Aerial cableways.**] *Schweiz. Z. Forstw.* 103 (12), 1952 (544–50). [G.f.]

Discusses the subsidizing of aerial cableways by public authorities in Switzerland and the conditions on which subsidies should be given.

2305. STEINLIN, H. Motorseilwinden für den Einsatz im Gebirgswald. [**Motor cable winches for use in mountain forests.**] *Z. Weltforstwirt.* 15 (3), 1952 (107–11). 6 refs. [G.e.f.]

Discusses the value of cable hauling on steep slopes and gives specifications with illustrations of 4 small motorized units, suitable for hauling timber in small-scale operations. The machines, all Swiss, are: (1) the 'Brun-KTA' with detachable wheels, permitting is use as a trailer, h.p. 7–8, 4 gears, tractive power in first gear 1500 kg., weight including cable 635 kg., made by Maschinenfabrik Brun and Co., Nebikon; (2) and (3) the Kupfer KS/V15, h.p. 6–7, 3 gears, tractive power 1500 kg., the whole unit mounted on runners, weight excluding cable 228 kg.; and the Küpfer MFL, a self-propelled model, h.p. 7–8, 6 forward and 2 reverse gears for driving and for working the cable, tractive power 1500 kg., road speed 2–10 km./hr., with a special trailer attachment for carrying tools etc., weight excluding cable 420 kg. Both these models are made by Maschinenfabrik L.u.E. Küpfer, Steffisburg; (4) the 12-h.p. tractor 'Plumett' which has a winch attachment, made by Ateliers de Constructions S.A., Bex.

2306. PUTKISTO, K. Puutavaran hankinnan koneista ja välineistä III. [**Machinery and equipment for logging III.**] *Tied., Metsäteho, Helsinki* No. 82, 1952. pp. 4. [Fi.e.]

Reports briefly on Swiss mobile motor winches, German 'Dolmar' powered wagons and Swiss steel-wire rope couplings, locking devices and traction devices. *From author's summary.*

2307. KIŠČENKO, T. I. Detali dlja soedinenija trelevočnyh trosov. [**Coupling devices for cables used in skidding.**] *Lesn. Prom.* 11 (10), 1951 (24). [Russ.]

To prevent twisting at the junction of the operating, haulback, and log-load cables, a device has been worked out consisting of a trunnion with two opposing swivel-hooks for the operating and haulback cables, between which a third hook is freely suspended from a shackle attached to the trunnion. A simple split link has also been designed in place of screw-locks for connecting cable ends.

2308. PERFILOV, M. A. Tipovye shemy trelevki lesa lebedkami TL-3. [**Typical skidding lay-outs with the TL-3 winch.**] *Lesn. Prom.* 12 (8), 1952 (6–9 + 4 dgms.). [Russ.]

Illustrated descriptions of 4 typical lay-outs officially recommended for: (1) skidding tree-length logs to a narrow-gauge railway; (2) as (1) but with provision also for cross-cutting and transport by rail or lorry; (3) as (2) but not including cross-cutting; (4) alternative lay-out to (2). [Cf. *For. Abstr.* 14 (No. 2271), in which publication this article is discussed and the diagrams reproduced.]

2309. ABUTKOV, B. V. Trosovaja setka dlja transportirovanija sučjev. [**Cable drag-net for the transport of branches.**] *Lesn. Prom.* 11 (5), 1951 (17–8). [Russ.]

Illustrated description of a drag-net ca. 4·5 × 10 m. with mesh size ca. 1·5 × 2 m., made from old steel cable, with a stretcher-log of 20 cm. diam. at either end, for transporting and unloading branchwood collected on the felling site.

2310. BURROUGHS, R. D. **The big wheels.** *Amer. Forests* 59 (2), 1953 (16–8).

An account of the large logging wheels (9, 9½, and 10 ft. high) manufactured by the Overpack Co. of Manistee, Mich., from 1870 until about 1936, when they were superseded by tractors and arches. The method of loading etc. is described.

2311. SHAW, R. H. **The use of large diameter wheels and tyres on forest extraction vehicles.** *For. Rec. For. Comm., Lond.* No. 18, 1953. pp. 8. Price 9*d.*

The U.K. Forestry Commission have investigated the use of wheels fitted with 11 × 36 tyres giving an over-all diameter of 58 in. (in place of the usual 39 in.) on one of their standard two-wheel trailers. The results showed the great advantage of fitting very large-diameter wheels to any load-carrying tractor which is to be used on soft or uneven ground. Over a stretch of soft, wet forest drive, the average horsepower required to pull a load of 2 tons on standard wheels was 55% greater than that required to pull the same load on 11 × 36 tyres. The worse the surface conditions, the greater was the advantage of the large wheels. It is clear that powerful and expensive tractors are sometimes used to do work that should be within the scope of smaller and cheaper machines. Moreover all this

unnecessary horsepower is being consumed in doing damage to the rides.

2312. KAPITONOV, I. T. Èlektričeskiĭ trelevočnyĭ traktor. **[Electric skidding tractor.]** *Lesn. Prom.* 12 (5), 1952 (9–12). [Russ.]

An illustrated description of the construction and operation of the ETT-1 tractor, based on the KT-12 tractor design with a view to using it for the skidding of tree-length logs. The features of the ETT-1 are: weight without cable 6600 kg., with cable 7600 kg.; pressure on soil ca. 0·5 kg./sq.cm.; working speeds from 1·67 (1st gear) to 11·20 (5th gear) km./hour; pulls, from 4350 to 140 kg.; motor 52 h.p.; nominal working voltage 1000 volts. A special wheeled transformer substation contains two transformers: 75 KW. for 2 tractors, and 20 KW. for loading apparatus, saws, and lighting. Comparative investigations have shown that the efficiency (per shift) of the ETT-1 is some 40% higher than that of the KT-12 tractor.

2313. ORLOV, S. F., and PAVLUŠKOV, L. V. Traktor KT-12 s udlinennoĭ ramoĭ. **[The KT-12 tractor with an extended frame.]** *Lesn. Prom.* 11 (5), 1951 (9–10). [Russ.]

Tests have shown that, in order to increase the weight of tree-length logs skidded by the tractor from ca. 4·5 to 6–7 tons without causing the nose of the tractor to rear, it is necessary to shift a mass of ca. 3 tons forward on the tractor by 325 mm., involving an equal increase in chassis length. It has been found that the modified tractor does not rear when the pull is increased to 5500 kg.; at the same time, the bearing surface of the track is increased by 12%, reducing the specific pressure on the soil.

2314. PUTKISTO, K. Maataloustraktoreiden käyttömahdollisuuksista puutavaran kuljettajina. **[The potential uses of agricultural tractors in timber transport.]** *Tied., Metsäteho, Helsinki* No. 72, 1952. pp. 5. 11 refs. [Fi.e.]

Investigations have shown that: (1) the ordinary agricultural tractor can be used to haul timber sleighs, provided that loading is done at an intermediate storage site to which the timber has been hauled by horses, that the tractor road has a firm level carriageway, that the gradients do not exceed 3–4% and the quantity of timber is enough to cover amortization of costs of constructing and maintaining the winter road; (2) to collect small quantities of timber straight from the logging area, the tractor must have rubber tracks and runners and possibly a winch, and the timber must be piled after felling along compartment haulage roads; and (3) for use on hilly roads the tractor must be equipped with trailers preferably of the single-axle type to which power is transmitted from the tractor. At present agricultural tractors are in use for 350–450 hours/year; use in forest haulage during the winter would increase this to ca. 1000 hours. *From author's summary.*

2315. HAKKARAINEN, A. E. Puutavaran autokuljeluksen kehittäminen ja autoasetus. **[The development of lorry transport of timber and the Automobile Act.]** *Metsät. Aikak.* 1953 (1), (11–4). 3 refs. [Fi.e.] (*Tied., Metsäteho, Helsinki* No. 85.)

Discusses some provisions of the 1948 Act, especially maximum axle loads, loading of trailers and the movement of lorries outside their own 'traffic areas', in their relations to timber transport. *From author's summary.*

2316. LESKIN, D. F., and MATVEEV, G. K. Vyvozka derevjev s kronoĭ na avtomobiljah. **[Lorry transport of trees with crowns.]** *Lesn. Prom.* 11 (6), 1951 (8–9). [Russ.]

Full-scale tests were made in 1950–51 on the use of lorries for the transport of tree-length logs with crowns, direct from the felling site to an industrial timber depot. The method has been found economically sound; for greater efficiency, methods of utilizing the waste in the depot must be improved.

2317. IPPOLITOV, K., and GUGALO, I. Sannyĭ pricep dlja avtomobiljnoĭ vyvozki hlystov. **[Sledge trailer for the lorry transport of tree-length logs.]** *Lesn. Prom.* 11 (9), 1951 (22–5). [Russ.]

The transition to transporting tree-length logs from the felling site, necessitated appropriate adaptations of the old sledge trailers. To this end, the principle of the low-built semi-trailer [cf. *For. Abstr.* 10 (No. 331)] was applied. The rear cross-beam of the lorry carries on chains or cables the fore end of two 'frame' beams (550 × 28 × 30 cm.) the other ends of which are attached pivotally to the first semi-sledge. A retaining stake is provided at about the centres of the two beams, while another is mounted on the second semi-sledge, the distance between the two stakes being 10–15 m. In March, 1951, in the Ustyug combine the average load per lorry-sledge was 16·3 cu.m., maximum 26 cu.m., on a haul of 16 km.

2318. DARAGAN, L. D., and PISKUNOV, M. M. Zimnjaja vyvozka lesa v hlystah na avtomobiljah. **[Winter transport of tree-length logs on lorries.]** *Lesn. Prom.* 11 (11), 1951 (11–3). [Russ.]

Describes two-runner and single-runner sledges of several designs, and analyses their performance from the technological and economic aspects. The low-built (Pallo design) trailers and semi-trailers work very economically in level country when winter conditions are steady and favourable. In all cases mechanized loading and unloading is the primary condition of high output.

2319. ŠABAŠEV, A. M. Vyvozka lesa v hlystah po traktornoĭ ledjanoĭ doroge. **[Transport of tree-length logs by means of a tractor on an ice road.]** *Lesn. Prom.* 11 (9), 1951 (18–22). [Russ.]

A detailed illustrated description of the operation, on an ice road 2·5 km. long, in 1950–51. The road was of the single-rut type, and an improved type of single-runner sledge was introduced, enabling log loads 16–18 m. long and 160 cm. wide (ca. 25 cu.m.) to be transported on each pair of sledges. From 5 to 7 sledge-pairs with tree-length logs and 4–5 sledges with cut logs formed one sledge-train for a tractor. The sag of the longest logs did not exceed 30–35 cm. between the two sledges. The tractor was also used for unloading. A saving of 19·5% in man-days (chiefly in cross-cutting, handling and sorting) was achieved by the new method.

320. Gorškov, D. S. Vyvozka hlystov k plavu. **[Transport of tree-length logs to the launching depot.]** *Lesn. Prom.* 12 (3), 1952 (6–9 + 2). [Russ.]

A detailed illustrated description of the transport of tree-length logs on a 26-km. narrow-gauge railway from forest dump to the river launching depot.

2321. Orel, G. F. Lesovoznye železnye dorogi a trosovoï tjagoï. **[Cable-operated forest railways.]** *Lesn. Prom.* 11 (6), 1951 (10–2). [Russ.]

Illustrated description of cable-driven forest railways used in the Transcarpathian region for transporting logs for distances of 600–1200 m. on slopes. The narrow gauge (750 mm.) permits curves of a radius down to 20 m., and a gradient up to 15% (the loaded trolley never moving uphill). The tracks are either single, or twin with a common siding; in the former the winch (usually TL-3 type) alternately lowers the loaded and raises the empty trolley, in the latter these two operations are simultaneous. The sleepers are laid without ballast, ca. 1400–1850/km.

2322. Kuvaldin, B. I. Bezballastnye lesovoznye reljsovye dorogi. **[Forest railways without ballast.]** *Lesn. Prom.* 11 (5), 1951 (4–8). [Russ.]

Criticizes the technical instructions for the construction of temporary forest railways without ballast, in particular the use of shorter sleepers (135 instead of 150 cm.), increase of the sleeper spacing (1286 instead of 1500–1700/km.), and the recommended use of lighter rails than for ballasted track. Many state forest enterprises use more and longer sleepers than provided for in the official instructions. It should be borne in mind that, besides the necessity for never exceeding the 'proportionality limit' (the maximum specific pressure on soil for which the magnitude of the rail sag is proportional to the pressure), it is imperative to prevent considerable differences between the moduli of elasticity for the track foundation under either rail. The author suggests a removable stay for maintaining a constant track distance. Investigations conducted on the Balakirev narrow-gauge railway for the purpose of determining the coefficients required for the calculation of tracks without ballast have shown that: (1) rails weighing 8 kg./m. should not be used for unballasted track; those of 11 kg./m. can be used on a solid soil foundation, while at least 15 kg./m. are required on a poor one; (2) the modulus of elasticity for the track foundation was 33·7 kg./sq. cm. for moist heavy loam, 45·5 for compact loam, and 22·8 for forest loam, saturated with water and having plant cover; on ballasted portions of the track the modulus decreased from 51 kg./sq. cm. for 2000 sleepers/km. to 28·2 kg./sq. cm. for 1250 sleepers/km. Despite the slowness of movement on sidings, the dynamic effect of the rolling stock greatly exceeds the static. The results further show that round sleepers can be used on loose soil for unballasted tracks. The use of rails of different weight can be obviated by using a proper spacing and length of sleepers. Diagrams of construction and tables containing essential data are given for the construction of 750-mm. track without ballast, using 15 kg./m. rails, on 5 different soil types. As the soil becomes less stable the permissible specific pressure falls from 1·5 to 0·15 kg./sq. cm. while the length of sleepers increases from 1·5 to 5 m., and their number per km. increases from 1420 to 3300.

378. *Water Transport*

See also No. 2336.

2323. Matson, E. E. **Bundling sawlogs and poles.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (50–1). I.F.B.

A technological and economic analysis of bundling in water and on lorries.

2324. Liming, G. E. **Bundling pulpwood in Western Washington.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (48–9). I.F.B.

Describes bundling of pulpwood and logs (8–40 ft. long) using $\frac{9}{16}$-in. wire-cable straps (acid-resistant) and special Meighan hooks. The handling of bundles at some dumps is also described.

2325. Žuravlev, L. I. Akkumuljacija zimnego stoka rek dlja lesosplava putem namoraživanija. **[Freezing as a means of storing winter stream-flow for timber floating.]** *Lesn. Prom.* 11 (11), 1951 (20–5). [Russ.]

Suggests a method of storing substantial quantities of water as ice to be thawed gradually at the beginning of spring for the purpose of maintaining high water on rivers during spring timber-floating. The method, which can be applied in the northern provinces of Siberia and of Russia in Europe, consists in providing ice dams across the rivers, so that the overflowing water floods the adjacent lowlands and finally forms a thick ice sheet on them. In the spring, this ice, mostly in shaded sites, under shrubs or sheltered by high banks, melts only gradually, thus providing a constant supply of water for floating purposes. The ice dams are formed preferably in places where the river suddenly narrows and the banks rise, by cutting 2–3 rows of holes ca. 1·5 m. in diameter in the 10–15 cm. of ice on the river so as to leave a thin ice layer at their bottom. There the frost causes further ice formation which, in turn, is similarly excavated, until the ice reaches the river bottom. The holes are spaced so as ultimately to produce a continuous ice dam across the river. An ice/snow dam is then built on the ice in front of the ice dams, and deep holes are cut through the ice in the wider part up-river; through these the water flows and floods adjacent areas. This method, used from time to time in Eastern Siberia, is claimed to give stored water at a cost well below that for large artificial water reservoirs. [Cf. *For. Abstr.* 9 (No. 1848); 14 (No. 2271). Appendix 11 of the latter gives a full English translation.]

2326. Vasiljev, A. V. Distancionno-gruppovoï metod molevogo splava. **[The convoy-by-stages method of loose floating.]** *Lesn. Prom.* 12 (4), 1952 (24–8). [Russ.]

Illustrated description of a method used since 1947 in the rivers of the Ob-Irtysh catchments. The timber to be floated is first accumulated in the backwaters of the upper reaches of the main rivers. Then a 'convoy' of 50–100,000 cu.m. at a time is started off, escorted at the rear by 20–60 men in several barges and 1–2 motor-boats of some 60 h.p. each. Every 50–80 km.,

halting stages are prepared in advance, to be used more frequently when the water is low, and less frequently when it is high. The rivers in the catchment are ca. 50 m. and more wide; with an average flow of 0·6 m./sec., the whole convoy averaging 25–26 km./24-hr. day. It is claimed that with the new method the cost of floating (per cu.m. for, say, 500 km.) is only $\frac{1}{20}$ of that of transport in towed winter rafts. The efficiency of the new method increases with the total volume of timber floated, rising steeply from about 100,000 cu.m.

2327. METTUS, K. JA. Splotočnaja mašina 'CNII lesosplava-2'. **[The 'CNII lesosplava-2' bundling machine for raft-building.]** *Lesn. Prom.* 12 (6), 1952 (20–2). [Russ.]

Illustrated description of a new machine, the first few models of which were in use in 1950–51. The machine was designed primarily for bundling small timber into small and medium-sized bundles on rivers and lakes. Given favourable conditions (suitable water level and rate of flow), the average output of the machine was 925 cu.m./shift for an average bundle size of 5·5 cu.m. The machine is 37·85 m. long, 13·6 m. wide, and is driven through two winches by 30- and 7·5-KW. electric motors, of 726 and 705 revs./min. respectively. It can make bundles up to 20 cu.m. from medium-sized logs 4·5–7·5 m. long. With the required crew of 7 workers, a bundle can be formed in 2·85 min. The maximum traction effort of the larger winch is 8 tons.

2328. MOSEVIČ, P. I. Mehanizacija zimneĭ splotki pri vyvozke lesa v hlystah. **[Mechanization of winter raft-building when logs are extracted as tree-lengths.]** *Lesn. Prom.* 11 (1), 1951 (23–7). [Russ.]

An illustrated description of various methods of winter bundling of tree-length logs into rafts by means of TL-1 and TL-3 winches, KT-12 and S-80 tractors, and self-propelled cranes. Two years' experience has shown the possibility of using winches for building rafts with a parallel arrangement of the logs. The winches are arranged on railway flats or on runners, and fitted with a crane arm. Log elevator-sorters mounted on the rolling stock of a narrow-gauge railway were used to increase the efficiency.

2329. PANOV, N. I. Plotovoĭ splav lesa v hlystah po gornym rekam. **[Rafting of tree-length logs on mountain rivers.]** *Lesn. Prom.* 11 (4), 1951 (17–9). [Russ.]

An illustrated description of rafts used in recent times for floating timber in the catchment of the river Cheremosh in the Eastern Carpathians. The raft consists of 5–6 sections, each ca. 8 m. wide at the front, 12 m. wide at the back (the logs being arranged with their tops to the front), the length of the sections being 12–18 m. There are 30–35 logs (ca. 35 cu.m.) in each; their front ends are rounded off below. The logs are connected by cables passing through 25-mm. holes drilled in each log horizontally, about $\frac{1}{4}$ of diameter from the top surface.

2330. RODIONOV, V. I. Morskie samozatjagivajuščiesja ploty. **[Sea-going, self-tightening rafts.]** *Lesn. Prom.* 12 (3), 1952 (10–2). [Russ.]

An illustrated description of new sea-going rafts suggested in 1950 by Samburskiĭ, and characterized by a self-tightening mechanism by means of a tow-line passing through a pulley system fixed along the raft. The raft (ca. 90 m. long) consists mainly of 6·5-m. logs arranged in staggered layers. The permanent transverse binding consists of 28 basic and 25 additional chains, while longitudinal stiffening is effected by one bottom (keel) and two upper (deck) cables. On the two latter are fixed staggered pulleys, through all of which a tow-line passes. At each end of the raft it also passes through a locking clamp; if one of these is released and tractive force applied to the line, the whole system constricts until the raft is rigid, when the clamp is re-locked. Two experimental rafts of this design were floated on the Caspian from Astrakhan to Baku, and proved superior in all respects to rafts of orthodox design; in particular 25% less gear was required and the 'technical' [average?] speed was 20–30% greater.

2331. TUOVINEN, A. Uppoaminen uiton alkuvaiheessa. **[Sinking in the initial phase of floating.]** *Tied., Metsäteho, Helsinki* No. 74, [1952?] pp. 17. [Fi.e.]

Floating experiments were made on 200 unbarked Pine logs, 400 logs of unbarked 4-m. Pine pulpwood, 200 logs of unbarked 4-m. Spruce pulpwood, 200 partly barked 6-ft. Pine pitprops after storage in the forest, 75 2-m. logs of strip-barked Birch and 75 of Aspen both after storage in the forest. Results, shown in graphs and tables with English legends, include the following: (1) There were no sinkers among the unbarked Pine logs but at the 3rd measurement (24 days after floating began) those waterlogged and of poor buoyancy totalled 2·6%, mostly among logs with little heartwood. The rate of sinking (reduction in floating height as a % of diameter) decreased during the floating period in logs with little heartwood, and increased with logs of high heartwood %. (2) Results of floating unbarked Pine pulpwood were poor. Sinkers were more numerous in small- than in large-diameter classes. Logs containing less than 20% heartwood should have a minimum diameter of 17–18 cm.; with 10–30%, 16 cm; with 30–40%, 15–16 cm.; and with over 40% heartwood, logs with top end diameter of 10 cm. can be economically floated at least for a time. (3) Spruce pulpwood contained much more heartwood than Pine. Despite their lower density, the floating height of Spruce logs was little better than that of Pine of the same diameter and heartwood classes. (4) Pine pit-props floated excellently after piling, in spite of small diameters and low heartwood %. (5) The Birch logs, which were also of small diameter, lost floating height rapidly during the period, the number of sinkers increasing with floating time. (6) Among the Aspen logs, which were of larger diameter, there were no sinkers and floating height remained good.

2332. TUOVINEN, A. Syksyllä veteen pudotettujen autonippujen uimiskyky. **[The buoyancy of bundles of pulpwood launched into water in the autumn.]** *Tied., Metsäteho, Helsinki* No. 78, [1952]. pp. 11. [Fi.e.]

Bundles of Spruce and Pine pulpwood, 3–4 m. long, made up a year or more after felling, were put into the water in October, 1951, and were untied and kept in a boom for 1–2 months at different times during the summer of 1952. The following main results, shown in graphs with English legends, were obtained: (1) There is little danger of sinking with Spruce logs left for a year before bundling and put in the water in autumn. The number of logs with a top-end floating height of less than 1 cm. when the bundles were untied in May, was below 1·3%, after untying in June 1·5%, and in early August 3·9%. The number of these logs in the 8–14 cm. class was 1–2% and rather higher at the last date of untying for diameters below 10 cm. (2) With the Pine pulpwood, 1·5% of the logs in bundles untied at the end of May were sinking or submerged and 10·6% had a floating height of less than 1 cm. No conclusions can be drawn as to the effect of untying later in the summer, and there may have been more than the normal amount of storage decay in the logs, which were felled 2 years before bundling. (3) The buoyancy of Spruce logs from the submerged part of the bundle improved after untying, so that after a month the total number of logs with poor buoyancy in the bundle was about ½ that at the untying. After some 2 months the number of logs with a floating height below 1 cm. was about the same as at the untying.

2333. Volodenkov, F. I. Mehanizacija pod'ema topljaka. [**Mechanization of the salvage of sunken logs.**] *Lesn. Prom.* 11 (5), 1951 (23–4). [Russ.]

Illustrated description of a working model of equipment for the salvage of sunken logs, consisting of an all-welded pontoon, 18·3 × 8·1 m., of 3·4 m. free board (2·8 m. at full loading), displacement 58·7 tons, with a crane capable of handling 2–3 tons depending on the boom length (4·1 to 13 m.). The grab is 2 m. long, opens to 1·8 m., and 'bites' 1·1 m. into the river or lake bottom. One complete working cycle of the grab takes 1·1 min. The installation also serves for dredging, having a hydraulic excavator and pumping apparatus.

2334. Kirevičev, V. E. Opyt avtomatizacii sortirovki lesa. [**An experiment in automatic mechanical sorting of timber.**] *Lesn. Prom.* 12 (6), 1952 (17–9). [Russ.]

Illustrated description of a device for remote-control automatic ejection of logs, fitted to a standard longitudinal, 120-m., B-16 log elevator-sorter. A pair of segment ejectors is provided for each assortment. The operator pre-selects this or that log for ejection by pressing a button connected with the 'ordering drum' which is provided with push-rods that actuate the ejector switches. The automatic device was tried during rain, snow, and frosts reaching — 32° C., 24,886 logs (8599 cu.m.) being sorted into 8 groups. The working rate of the sorter averaged 180 cu.m. (maximum 297 cu.m.) per shift. It is believed that the absolute maximum possible is ca. 380 cu.m./shift. Only one operator was required.

38. FOREST ENGINEERING

381. *Materials (including Explosives and their Use)*

See Nos. 1866, 2289.

383. *Roads and Bridges*

See also Nos. 2273, 2557.

2335. Novotný, M. Úvaha o nejlepším zpevnění vozovek pro moderní motorickou dopravu v lesnictví. [**The best road surfacing for modern motorized transport in forestry.**] *Lesn. Práce* 30 (4), 1951 (376–84). 2 refs. [Cz.]

Analyses from the technological and economic aspect the following types of forest road: gravel, resin-bound substances, concrete, asphalt, and paved. In the long run, concrete-surface roads are cheaper than all other road types, including the paved ones, but as they can be used only for very small gradients, paved roads must be considered the best of all. The roads can be paved with fire-clay or paving bricks, ordinary bricks, wood, or stone, the last, especially granite and syenite, being preferable to all others.

386. *Waterways. Stream Training*

See also No. 1898.

2336. Volodenkov, F. I. Plotina-vremjanka. [**A temporary dam.**] *Lesn. Prom.* 12 (3), 1952 (12–4). [Russ.]

Illustrated description of an all-wood temporary dam, 60 m. long, built in 1951 near one of the rapids of the river Tuloksa in order to effect daily control of flow. Ninety cu.m. of timber, and 138 man-days were required for the erection of the dam.

2337. RUBNER, K. Neudammer forstliches Lehrbuch. 3. Lieferung. **[Neudamm textbook of forestry. Pt. 3.]** Neumann Verlag, Radebeul & Berlin [10th ed.?] 1951. pp. 353–576. 7 refs. [G.] Price *DM*8 [15*s*. 6*d*.]

The present part covers forest protection against damage by inorganic agencies (*E. Herrmann*), plant agencies (*E. Herrmann*) and animals (*A. M. Röhrl*). [Cf. *For. Abstr.* 12 (No. 1662).]

41. GENERAL TECHNIQUE OF FOREST PROTECTION. TYPES OF INJURY

411. *Natural and Biological Control*

See Nos. 2430, 2435, 2448, 2456, 2458–9, 2467–8, 2472–3, 2490, 2492, 2497, 2501.

414. *Chemical Control*

See Nos. 2371–3, 2436–43.

42. INJURIES FROM INORGANIC AGENCIES OTHER THAN FIRE

421. *Air Currents*

See also No. 2410.

2338. STEVEN, H. M. **Storm damage to woodlands in Scotland on January 31, 1953.** *Nature, Lond.* 171 (4350), 1953 (454–6).

Describes the nature and extent of the damage and discusses problems of salvage. Few woods of less than 40 ft. in height were damaged. Scots Pine suffered the most heavily, both absolutely and relatively to Sitka Spruce, Larch, and Douglas Fir. Beech and Oak were also blown over. [Cf. *For. Abstr.* 14 (p. 241).]

422. *Temperature Influences. Frost. Heat. Drought*

See also No. 2410.

2339. FOSTIER, G. Les lésions des chênes par le gel. **[Frost injuries in Oak.]** *For. France* No. 42, 1952 (14). [F.] X.

The author discusses the connexion between, and causes of, frost crack and ring shake in Oaks. From his observations in the Ardennes he concludes that: (1) trees with frost crack always exhibit ring shake when felled; and (2) there is a connexion between soil factors and the occurrence of ring shake. On the schists of the northern Ardennes most of the Oaks display frost crack and ring shakes and are badly grown, whereas on the deep clay soils to the south the Oaks are well grown and rarely display those defects except in certain calcareous areas where, again, most of the trees suffer from frost crack and ring shakes.

2340. KREČMER, V. Vliv sucha roku 1947 zejména na výškový přírůst lesních dřevin. **[Effect of the 1947 drought, in particular on the height increment of forest trees.]** *Sborn. čsl. Akad. zeměd.* 25 (3), 1952 (243–60). 41 refs. [[Cz.cz.russ.g.] C.G.B.

Presents the results of an investigation into the essential factors causing the characteristic dryness of the Brnik forest district near Kostelec (Bohemia), and the damage brought about by the 1947 drought. The damaged stands are mainly of S.W. aspect, at an altitude of ca. 400 m.; the soil is a podzolized sandy loam or loamy sand. The annual height increments have been graphed for *Pinus sylvestris* (age 16 years), *Pinus strobus* (6–7 years), *Picea abies* (16 years), and *Abies alba* (25–30 years) from measurements of the leaders, for the period 1946–51. It has been found that: (1) weather during the preceding growth period affects the following year's growth: the height growth was reduced in 1948; (2) the 1947 drought had an adverse effect on the current height growth, particularly for *P. strobus*, *P. abies*, and *Abies alba*, which can be explained by the intensity of the drought and by its having started early in the spring after a not very favourable winter; (3) the stands of the area investigated suffer, in general, from an unfavourable soil composition, soil degradation, and the nature of the stands themselves (monocultures of Pine or Fir).

2341. **[Injury to seedlings from soil radiation.]** *Rep. Dep. Agric. Seychelles 1951*, [1952], (21–2).

It was noticed that seedlings planted in exposed soil suffered a distinct check, and often wilted for several days, some actually dying. This was found to be due to the great surface heat radiation of the granitic soil, reinforced in some cases by the reflection of the sun's rays from silica crystals. The remedy adopted was to place a circle of vegetable matter, about twice the size of a dinner plate and about $\frac{3}{4}$ in. deep, round each plant. This gave some improvement in survival and marked improvement in growth, with very little check; the slight extra work involved is well worth while.

2342. GRASSO, V. Ancora sul deperimento del ciliego (1948–51). **[Further observations on die-back of Cherry (1948–51).]** *Notiz. Malatt. Piante* No. 17, 1951 (34–9, 69). 5 refs. [It.e.] I.M.I.

Observation of a number of Cherry orchards in different parts of Italy leads the author to conclude that the cause of the frequent die-back is sun-scald originating on the exposed south side of trees.

424. *Soil Conditions. Erosion Effects*

See also Nos. 1898, 2194.

2343. WHITNEY, R. D., and GROENEWOUD, H. VAN. **Openings in White Spruce stands at Candle Lake, Saskatchewan.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (6), 1952 (2).

The openings are $\frac{1}{20}$–$\frac{1}{10}$ acre in extent with all trees dead or dying. Examination showed no obvious signs of disease, but in all cases the soil profile of the affected spots differed markedly from that of the surrounding area, having a gley horizon and only about 7% non-capillary pore space in the top soil compared with 13% in the unaffected areas.

2344. Němec, A. Příspěvek k otázce krnění borovice na degradované hadcové půdě. (Intoxikace chromem, niklem a kobaltem.) **[Stunted growth of Pine on degraded serpentine soil. (Chromium, nickel, and cobalt poisoning).]** *Lesn. Práce* 30 (3), 1951 (214–37). 17 refs. [Cz.cz.russ.e.]

The serpentine soils in the Borek forest district belong to the type of degraded Mg rendzinas, the degradation being characterized mainly by high acidity of both the humus layer and the upper layers of the mineral soil to a depth of 20–35 cm. The chemical degradation of the soil is characterized by leaching of Ca, P_2O_5, SiO_2, Al, and Fe from the upper layers and their deposition in the lower layers (20–40 cm. deep). Owing to the supersaturation of the soil with Mg, Loew's 'Ca factor' is unfavourable. The Cr content is high, but it first decreases and then increases again with increasing depth; a proportion is present in the form of a soluble compound. Foliage of an old stunted Pine was found to contain 19 to $25 \times 10^{-5}\%$ of Cr_2O_3 in the dry substance. The root bark had the maximum Cr content, viz. $16 \times 10^{-4}\%$ of Cr_2O_3. These figures point to Cr poisoning of the Pine. Cr has been found as a trace element in the soil, its content rising sometimes to 0·720% of Cr_2O_3. The Ni content reaches $71{\cdot}9 \times 10^{-3}\%$. Both Co and Cu are also present in the soil. The Pine foliage also reveals a disturbance in Ca and P_2O_5 nutrition.

2345. Neilson-Jones, W. **Fused needle disease in *Pinus palustris*.** *Emp. For. Rev.* 31 (4), 1952 (325–6 + 2 photos). [Bedford College, University of London.]

In spring 1950, 65 plants of *P. palustris* sown in 1948 were transplanted from the nursery to the forest (Wareham, England). There was no trace of fused-needle disease during the period in the nursery, but several instances were noted during 1951 and, by May 1952, 41 of the 62 surviving plants were showing clear symptoms of the disease. Affected needles were restricted to those produced towards the end of the 1950 growing season and still unshed in 1952. It is suggested that the sudden and transitory development of the symptoms is related to reduction in the root's normal capacity for water absorption, caused by the removal of the plants to a new site. [Cf. *For. Abstr.* 8 (No. 658).]

2346. **[Use of fertilizers in plantations of *Pinus radiata*.]** *Rep. For. Comm. Tasm. 1951/1952*, 1952 (12).

Plots in the Beaconsfield Plantation were treated in August 1949 with commercial superphosphate at a rate of 8 cwt./acre. As early as March 1950 the effect of treatment was seen in improved colour of young needles. In November 1950, the new season's needles on the treated plots were twice as long as comparable ones on the untreated plots; trees that had carried fused needles produced normal needles and in some cases previously fused needles had separated. For the 1949–50 growing season there was no significant difference in diameter growth between plots, but for the 1950–51 season the treated plots showed significantly higher increases in diameter, and this difference was still greater in the following season.

425. *Chemical Influences (Atmospheric)*

See also No. 2410.

2347. Jones, E. W. **Some observations on the lichen flora of tree boles, with special reference to the effect of smoke.** *Repr.* from *Revue Bryologique et Lichénologique, Paris* 21 (1/2), 1952 (96–115). 3 refs. [E.e.]

The possibility of using the nature of the lichen growth on tree boles as a means of comparing the degree of smoke pollution of the atmosphere in different places is discussed. When the atmosphere is heavily polluted, lichens are absent. With decreasing pollution the following changes occur: (1) A single species of *Lecanora* gradually increases in amount and becomes more fertile; it may attain 60–80% cover before any more species enter. (2) Additional species enter, including smoke-tolerant species of *Parmelia*. (3) Species of *Ramalina* and *Evernia prunastri* enter. The base of the bole is always richer and more completely covered than its higher part but the difference is reduced by shelter. Oak is a less favourable substratum than Elm or Ash. In quantitative sampling [discussed in some detail] attention must be paid to both these factors if results from different localities are to be strictly comparable. [Cf. *For. Abstr.* 14 (No. 941).] *From author's summary.*

2348. Jones, E. W. **The flora of tree boles, with special reference to the effect of smoke.** *J. Oxf. Univ. For. Soc. (4th Ser.)* No. 1, 1953 (2–7).

A shorter account of the studies reported more fully in the *Revue Bryologique*. [See preceding abstract.]

2349. Němec, A. Příspěvek k otázce odumírání smrku v Rudohoří se zvláštním zřetelem ke kouřovým škodám. **[Die-back of Spruce in the Erzgebirge with particular reference to smoke damage.]** *Lesn. Knihovna (velká Řada)* No. 5, 1952 (167–227). 28 refs. [Cz.russ.e.]

The deterioration of Spruce stands (die-back of lower branches) in several areas of the Erzgebirge can be partly explained by very poor soil conditions, viz. high acidity, lack of Ca, Mg, K, P_2O_5, and soluble SiO_2, and a high content of SO_3 and Al_2O_3. Another important factor is the high content of SO_3 in the Spruce foliage (varying from 0·264 to 0·850% of dry weight), as compared with the figure of 0·101% for Spruce growing in an SO_2-free atmosphere. The toxicity limit of SO_2 in air is 1/1,000,000 volumes, while the ratio in the areas observed varied from 1/405,000 to 1/191,000 owing to the burning of coal in industrial plants and on open-cast dumps in the vicinity.

2350. Vulterin, Z. Bioklimatické poměry Severočeské hnědouhelné pánve a přilehlé části hřebene Rudohoří vzhledem k chřadnutí lesních porostů. **[Bioclimatic relations between the North-Bohemian brown coal basin and the adjacent part of the Erzgebirge range, with reference to the deterioration of forest stands.]** *Lesn. Knihovna (velká Řada)* No. 5, 1952 (228–41 + 1 map). 7 refs. [Cz.russ.e.]

In view of the relationship between the yearly dying-back of Spruce stands in the Erzgebirge region adjacent to the North-Bohemain coal-mining area,

and the industrial pollution of air with SO_2 the author discusses the air currents, humidity, precipitation, and temperature of the air. It is the S.E. wind, relatively frequent in this region, that brings most of the SO_2 to the Erzgebirge; the maximum saturation of air with SO_2 occurs in winter, when air humidity is highest. Conifers, which naturally suffer more than deciduous trees, show the worst effects of poisoning early in the spring.

43. FOREST FIRES

2351. TURČEK, F., and LEHOŤAN, T. Lesné požiare na Slovensku v roku 1947. **[Forest fires in Slovakia in 1947.]** *Zpr. výzkum. Úst. lesn. ČSR* No. 3, 1949 (132–41). 6 refs. [Slovak.russ.e.]

Analysis of answers to a questionnaire shows that, out of the 446 fires in the period March–October 1947: (1) the greatest number of fires is associated with the month with the lowest rainfall; (2) most fires occurred at moderate elevations (400–800 m.); (3) ca. 90% of them were ground fires; (4) most fires started about noon; (5) fires were more frequent in broadleaved than in conifer forests; (6) trees of the 1st age group had the most fires, while the incidence was less in the 2nd–4th groups, to rise again for the 5th age group; and (7) the most frequent cause of forest fires was carelessness, then sparks from locomotives, arson, and lightning.

431. *Predisposing Factors and Causes. Fire Danger. Fire Behaviour*

2352. **Inflammability [of slash] and fire behaviour.** *Rep. Nth. Rocky Mt. For. Range Exp. Sta.* 1952 (28–30).

Preliminary experiments at the Priest River laboratory showed that: (1) the finer parts of entire branches dried to a moderately inflammable condition within one week after the tree was felled; (2) the spread of fire was fastest when heavy slash (32·5 tons/acre) and slowest when light slash (7·5 tons/acre) was present; (3) species retaining their needles burnt hotter and faster than those from which the needles dropped as they dried; (4) on 24 plots where slash had been chipped by machine, inflammability was much lower than on plots with natural slash.

2353. INOUE, K. **[Moisture indicator paper for fire-weather forecasts.]** *Bull. For. Exp. Sta. Meguro, Tokyo* No. 54, 1952 (79–100 + 1 tbl.). 13 refs. [Jap.e.]

Test paper moistened with $CoCl_2$, which turned blue when the moisture content of the litter was low and red when it was high, proved successful in predicting fire danger. The sensitivity of the test is statistically analysed.

432. *Prevention and Control*

See also No. 1865.

2354. COBB, S. S. **An answer to forest fire prevention and control in anthracite coal fields.** *J. For.* 50 (11), 1952 (834–7).

Fire-fighting units ('smoke chasers') are kept standing by during the fire season at strategic points, ready to start within a minute of notification by the look-out system that a fire has been spotted. Since the system was adopted in Lower Luzerne County, Wyoming, the number of 'crew fires' has been reduced from 376 to 33–38 p.a.

2355. CHORLTON, R. W. **The Wright hose vulcanizer.** *Misc. Publ. For. Br. Can.* No. 1, 1950. pp. 11.

Describes a device for patching and splicing forestry fire hose.

435. *Benefits of Fire Control. Injurious Effects of Fire. Fire Losses*

See also No. 2951.

2356. **Forest fire losses in Canada 1951.** Forestry Branch, Department of Resources and Development, Ottawa. 1952. pp. 10 + 6 tbls.

2357. BANKS, W. G., and OSTRANDER, M. D. **The Southeastern [*sic*] Maine fire area—four years later.** *Ntheast. Res. Notes Ntheast. For. Exp. Sta.* No. 18, 1952. pp. 4. 2 refs.

A brief account of its effect on local economy and of restocking on the burnt areas of southwestern Maine. [Cf. *For. Abstr.* 11 (No. 639).]

436. *Beneficial Effects of Fire. Uses of Fire in Silviculture and Other Forms of Husbandry*

2358. JANSSON, J. R. **Some effects of fire upon Douglas-Fir soils in the Big Belt Mountains.** *Proceedings of the Montana Academy of Sciences, Missoula, Mont.* 9, 1949 (1951), (17–21). 3 refs. L.B.M.N.

It has been found that burning (1) decreases the acidity of Douglas-Fir soils which, on an average site IV, are acid in the upper horizons; (2) results in an increased K content which is rendered mobile and leaches into the soil; (3) results in increased amounts of N compounds in the soil on better sites; and (4) causes increased leaching in upper horizons. [Cf. *For. Abstr.* 14 (No. 402).]

2359. **Loss of Pine seed in winter fires.** *Sth. Lumberm.* 185 (2321), 1952 (260).

Figures are given showing for 1950–51 and 1951–52 the number of Loblolly Pine seedlings/acre on plots burnt before and after the main seedfall. The comparatively few seedlings on plots burned after seedfall appear to arise from seed lodged in protected spots or from that disseminated after the main seedfall.

44. DAMAGE BY HARMFUL PLANTS. VIRUS DISEASES

441. *Weeds*

See also Nos. 2176–7, 2213–4, 2233–6, 2430.

2360. TAKAHASHI, N. **[Eradicating Kumai-Sasa (*Sasa paniculata*) by heavy grazing in the forest.]** *Misc. Inform. Tokyo Univ. For.* No. 9, 1952 (7–16 + 8 photos). 9 refs. [Jap.e.]

Heavy grazing by cattle, pigs and sheep on two plots in hardwood forest over 3–4 years successfully reduced the density of *S. paniculata* on the forest floor, while most of the stock remained in good condition. Pigs were especially effective in eradicating the weed. *From author's summary.*

2361. Holly, K. **Chemical defoliants and arboricides in relation to problems of tsetse fly control in East Africa.** Colonial Office, London. [1952?]. pp. 44. Numerous refs. [Agricultural Research Council, Unit of Experimental Agronomy, Oxford.] O.R.E.

A report on the first of a series of visits to E. Africa to test various chemicals for defoliant activity under tropical conditions, to initiate experiments in the application of phytotoxic compounds to various problems of tsetse-fly control, and to try aircraft applications of different compounds on types of vegetation as yet untreated. Experiments to evaluate possible arboricides for control of regrowth after clearing were begun, and definite results will be reported later. The results of screening tests of defoliants on various species are reported. One important discovery was the unexpected defoliant action of chlorinated phenoxyacetic acids on many species. Derivatives of these and of the endoxo-hydrophthalic acids seem the most promising (from the point of view of practical helpfulness) of the compounds tested. Data obtained from aerial applications of *n*-butyl 2,4,5-T in diesel oil show that the dosage retained near the top of the canopy was reasonably high, i.e. just over 30 mg. per sq. m. of leaf. It is probable that the amount of retention depends upon the physical characteristics of the spray or aerosol. The effects of synthetic growth regulators on abscission processes are discussed. Appendices to the report include an account of the vegetative characters of the woody species under experiment, and a study of time-response and dosage-response relationships in experiments with defoliants. [Cf. *For. Abstr.* 12 (No. 2327).]

2362. Hattingh, E. R. **Comments on thorn scrub control with herbicides in Africa.** *Weeds* 1 (4), 1952 (372–3). 2 refs. O.R.E.

Encroachment on bushveld by *Acacia* spp. and *Dichrostachys glomerata* is a comparatively recent problem. Spraying with a mixture of esters of 2,4-D and 2,4,5-T was tried on *A. heteracantha*. At least 2 sprayings appeared to be necessary for a complete kill.

2363. Hesmer, H. Wuchsstoffbekämpfung von Unhölzern und Forstunkräutern. **[Control of unwanted woody species and forest weeds with growth-regulating substances.]** *Forstarchiv* 23 (2/3), 1952 (41–5). 7 refs. [G.]

Summarizes the results of preliminary trials in the Kottenforst of 'Tributon', a new 2,4-D/2,4,5-T ester formulation shortly to be put on the market by the Bayerwerke, Leverkusen. Various concentrations, mixtures and emulsions [not specified, though the 'normal' concentration is stated to be an 0·65% aqueous solution at rates of 1000–1500 litres/ha.] were applied with knapsack and motor sprayers. In the first trial, 22–25 September 1950, *Lonicera*, *Epilobium angustifolium* and *Rubus idaeus* were killed; *Sambucus nigra*, *Rubus fruticosus* and Hornbeam coppice all showed some re-growth the next year (though much of the first two was killed); and bracken, which was not seriously damaged, vigorously invaded the patches of *Rubus* that had been killed. In the second, on 15 June 1951, drizzle set in and probably affected results. On 16 December 1951, *Betula verrucosa*, *Salix caprea*, *S. cinerea*, *Lonicera*, *Cytisus scoparius*, and *Rubus idaeus* appeared to be dead; *R. fruticosus* was severely damaged but not entirely killed; *Sorbus aucuparia*, *Populus tremula*, *Carpinus betulus* and *Rhamnus frangula* were defoliated and showed twig damage, but were not killed. *Ilex aquifolium* appeared resistant. *Quercus robur* and *Fagus sylvatica* both appeared relatively resistant, especially the latter, but *Picea abies*, *Pinus sylvestris* and *Larix* very susceptible to direct spraying, so that the preparation cannot be recommended for treating young conifer plantations. *Epilobium angustifolium* was again killed, but bracken recovered from the slight injury inflicted. Tributon may be of interest for killing epicormics on Oak: a trial spraying of epicormics on a single tree apparently killed them without causing any other damage.

2364. McCully, W. G., and Darrow, R. A. **Control of Post and Blackjack Oaks with growth-regulator herbicides.** *Proc. 5th ann. Sth. Weed Conf.* 1952 (137–40). O.R.E.

Presents the results of foliage sprays, aerial sprays, basal and cut-surface applications of growth-regulator chemicals to *Quercus stellata* and *Q. marilandica* in tests made throughout 1950 and 1951 by the Texas Agricultural Experiment Station. Low aerial sprays proved best for extensive areas with single or repeated applications of 2,4,5-T or brush-killer mixtures at 1·5 lb./acre. Coppicing in small areas of saplings, or natural regeneration not exceeding 5–6 in. in diam. is best controlled with basal treatments using esters of 2,4,5-T, 2,4-D, or mixtures of 2,4,5-T and 2,4-D at concentrations of 16–24 lb./100 gal. oil. Cut-surface applications of similar formulations and concentrations are also effective.

2365. Fertig, S. N., Vangeluwe, J., Flagg, C. V., Beatty, R., and Lacko, E. **Comparison of various herbicides for Thorn Apple [*Crataegus* sp.] control in pastures.** *Proc. 6th ann. Ntheast. Weed Control Conf.* 1952 (293–301). O.R.E.

2366. Parker, K. W., and Martin, S. C. **The Mesquite problem on Southern Arizona ranges.** *Circ. U.S.Dep. Agric.* No. 908, 1952. pp. 70. 36 refs.

Deals largely with methods and costs of poisoning.

2367. Darrow, R. A. **Chemical control of Prickly Pear Cactus.** *Proc. 5th ann. Sth. Weed Conf.* 1952 (159–61). O.R.E.

Summer applications of 2,4,5-T esters at 1% acid equivalent in oil gave satisfactory control of *Opuntia lindheimeri* and *O. engelmannii*.

2368. Gattis, J. L., and Francisco, D. **Chemical brush control of rights-of-way in the Tennessee Valley region.** *Proc. 5th ann. Sth. Weed Conf.* 1952 (143–5). O.R.E.

Best results with foliage sprays were obtained by using equal parts of 2,4-D and 2,4,5-T esters at a rate of 4000 p.p.m. and using 9–12 lb. acid/acre.

2369. Bodwell, W., and Hodgdon, A. R. **Brush control work in New Hampshire, particularly with relation to public utility lines.** *Proc. 6th ann.*

Ntheast. Weed Control Conf. 1952 (335–9). 3 refs. O.R.E.

Presents specifications and lists of woody species affected, partially affected, and unaffected.

2370. TREVETT, M. F. **Control of woody weeds in low-bush blueberry fields.** *Bull. Me. agric. exp. Sta.* No. 499, 1952. pp. 23. 10 photos.

Indicates in some detail, dosages, methods of application, and spraying equipment.

2371. HAUGEN, A. O. **Ammate in the diet of deer.** *J. Wildlife Mgmt.* 17 (1), 1953 (33–6). B.A.P.

Ammate in crystalline form and Ammate-treated foliage had no ill effects when fed to deer.

2372. GRIGSBY, B. H., and BALL, C. D. **Some effects of herbicidal sprays on the hydrocyanic acid content of leaves of Wild Black Cherry (*Prunus serotina* Ehrh.).** *Proc. 6th ann. Ntheast. Weed Control Conf.* 1952 (327–30). O.R.E.

[Cf. *For. Abstr.* 14 (No. 411)]. Spraying with 2,4-D, 2,4,5-T, mixtures of these compounds, and NH_4 sulphamate appears not to increase the HCN content, and hence the potential danger of the leaves to livestock.

2373. LYNN, G. E., and BARRONS, K. C. **The hydrocyanic acid (HCN) content of Wild Cherry leaves sprayed with a brush killer containing low volatile esters of 2,4-D and 2,4,5-T.** *Proc. 6th ann. Ntheast. Weed Control Conf.* 1952 (331–3). 2 refs. O.R.E.

The sprays did not increase the HCN content of leaves of *Prunus pennsylvanica*. [Cf. preceding abstract.]

442. *Parasitic (Higher) Plants. Climbers and Epiphytes*

2374. ANDERSON, R. L., and KAUFERT, F. H. **The control of dwarf mistletoe on Black Spruce.** *Minn. For. Notes* No. 13, 1953. pp. 2.

Recommends silvicultural measures for the eradication of *Arceuthobium pusillum*. [Cf. *For. Abstr.* 13 (Nos. 3969–70).]

443. *Fungi and Bacteria*

See also Nos. 1958 *et seq.*, 2101, 2432.

2375. BROOKS, F. T. **Plant diseases.** Oxford University Press, London. 2nd ed., 1953. pp. xii + 457. More than 1200 refs. Price £1. 18*s*.

A complete re-writing of the first edition.

2376. MURRAY, J. S. **Recent research on forest pathology in Holland.** *Quart. J. For.* 47 (1), 1953 (41–7).

2377. BAGCHEE, K. **A review of work on Indian tree diseases and decay of timber and methods of control.** *Indian For.* 78 (11), 1952 (540–6). 17 refs.

Cf. *For. Abstr.* 14 (No. 1309).

443.2. Diseases of Seed and Seedlings; Damping Off etc.

See also Nos. 2167–9, 2410.

2378. ITO, K., and KONTANI, S. **[The causal fungus of web-blight of leguminous woody plants.]** *Bull. For. Exp. Sta. Meguro, Tokyo* No. 54, 1952 (45–78). Many refs. [Jap.e.]

Symptoms of a disease caused by a parasitic fungus on *Amorpha fruticosa* seedlings and on varieties of *Robinia pseudoacacia* are described. The fruiting stage of the fungus agrees closely with descriptions of *Corticium vagum*, the perfect stage of *Rhizoctonia solani*, and of *C. sasakii*. Contrasting features between the two fungi reported by Japanese writers are shown in tabular form. The *Corticium* isolated from leguminous woody plants showed some characteristics of both fungi. There were, however, no morphological or physiological characters to suggest that it should not be classed as *C. vagum*, of which the authors conclude that it is probably a strain. *From author's summary.*

2379. PALM, B. **A die-back disease of *Metasequoia*.** *Bot. Notiser* 1952 (4), (441). 2 refs. [E.] O.B.D.

A 'die-back' due to *Botrytis cinerea* was discovered on young *M. glyptostroboides* plants in northern Scania. Trees growing under favourable light conditions recovered; those in heavy shade were killed. Growth was much retarded in trees severely attacked.

443.3. Diseases of Older Stages

Stem, Butt and Root Rots; Root Diseases

See also No. 2489.

2380. HENNIG, R. Stock- und Stammfäulen an der Douglasie. **[Butt and stem rots of Douglas Fir.]** *Z. PflKrankh.* 58 (1/2), 1952 (6–9). 4 refs. [G.] I.I.E.

Fellings and increment borings taken just above ground level in stands of *Pseudotsuga taxifolia* var. *viridis* in Saxony showed heart rot, caused in a 66-year stand by *Polyporus schweinitzii*, and in 38- and 39-year stands by *Sparassis ramosa*, hitherto recorded only on Pine. Few of the trees showed outward signs of decay. *Hylecoetus dermestoides* was found on some of the trees decayed by *S. ramosa*.

2381. FOSTER, R. E., and FOSTER, A. T. **Estimating decay in Western Hemlock: suggested aids to the inventory in the Queen Charlotte islands.** *B.C. Lumberm.* 36 (11), 1952 (42–3, 93, 96, 100, 118). 4 refs.

No reliable external indicators of decay in living trees were found, most of the decay being classified as hidden defect, but there appeared to be a linear relationship between the stand defect % and the volume of dead trees/acre expressed as a % of stand volume. For quantitative inventory, tabulated figures are given showing the relationship of decay to diameter, gross volume and site index (based on height/diameter relationship of dominant trees at maturity). Decay was found to increase progressively with diameter on site indices 80, 100 and 120. Extensive losses were recorded on the poorer sites, and on diameters over 40 in. For qualitative inventory, decay losses were related to log grade and diameter. Within each diameter class and in relation to gross volume, decay was more extensive in Grade 3 than in Grade 1, but on the basis of wood quality, decay was equally if not more important in the higher grades. [Cf. *For. Abstr.* 13 (No. 3977).]

2382. FOSTER, R. E. **Decay in Western Hemlock in the Upper Columbia region.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (5), 1952 (3).

Echinodontium tinctorium was found to cause more than 60% of the decay of *Tsuga heterophylla* in this area. Immature stands contained ca. 20% defect at 150 years and mature stands reached an advanced stage of deterioration at 250 years.

2383. WHITNEY, R. D. **Root disease of Balsam Fir.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (5), 1952 (2).

Dead Balsam Firs occurring singly and in groups in Manitoba and Saskatchewan were found to have been killed by *Armillaria mellea.*

2384. AOSHIMA, K. **[Butt rot of *Abies mariesii* and *A. veitchii* caused by *Tyromyces* [*Polyporus*] *balsameus* and *Fomitopsis* [*Fomes*] *annosa.*]** *J. Jap. For. Soc.* 34 (10), 1952 (305–6). 10 refs. [Jap.e.]

Found for the first time in the higher mountain regions of Honshu.

2385. TOOLE, E. R., and BOYCE, J. S., JR. ***Fomes annosus* on Atlantic White Cedar.** *Plant Dis. Reptr.* 36 (8), 1952 (330). A.P.B.

Two-thirds of a plantation of *Chamaecyparis thyoides* near Asheville, N.C., was found to be dead or dying as a result of *Fomes annosus* attack on the roots.

2386. ROTH, E. R. **Roots of living *Pinus rigida* decayed by *Fomes annosus*.** *Plant Dis. Reptr.* 36 (8), 1952 (330). A.P.B.

Cultures from decayed roots of uprooted *P. rigida* in North Carolina proved to be *Fomes annosus.*

2387. JOSIFOVIĆ, M. *Trametes radiciperda* i *Dasyscypha wilkommii* u nekim šumama Slovenije. **[*Fomes annosus* and *D. willkommii* in some Slovenian forests.]** *Glasn. šum. Fak., Beograd* No. 5, 1952 (209–19). 9 refs. [Serb.f.]

Between 20 and 30% of stems (and roots) of wind-thrown or recently felled *Picea abies* in Slovenia have shown rot due to *F. annosus.* The author recommends rapid removal of the attacked stems, after the attack has been diagnosed by Pressler's borer; gradual conversion of pure Spruce to mixture; afforestation of denuded areas with Fir or hardwoods; in younger Spruce stands, vigorous thinning, and control of acidifying weeds. *Larix decidua* growing in the same region has been found to be attacked by *D. willkommii:* ca. 30% of 50- to 70-year-old, and 50% of 10- to 30-year-old stems had at least one canker each. Removal of infected stems, choice for future plantations of sites with a more favourable microclimate, and trials with the Sudeten variety, and *L. eurolepis* are recommended.

2388. FERNANDES, C. TAVEIRA. Le mal des châtaigniers au Portugal. **[Chestnut 'ink' disease in Portugal.]** *Publ. Serv. flor. aqüic. Portugal* 18 (2), 1951 (111–20). 12 refs. [F.]

The following treatment of Chestnut suffering from 'ink' disease in Tras as Montes gave good results. The roots were uncovered to a depth of at least 50 cm. below the collar, cleaned with a wire brush, then coated with a sticky substance (starting a little above the collar) and dusted with powdered $CuCO_3$. A little time was allowed to elapse before the roots were covered again, in order to let the substance take effect. If treated in winter, the roots may also be pruned. The procedure is only suitable for trees grown for nut production; it is not recommended for forest conditions.

2389. ERDEM, R. Türkiye'de kestane ölümünün sebepleri ve savaş imkânları. **[Causes of Chestnut [*Castanea sativa*] disease in Turkey and possibilities of control.]** *Tar. Bak. Orm. gen. Müd. Yay.* No. 102, 1951. pp. 82 + [6]. 57 refs. [Turk.g.]

The extent of damage by *Phytophthora cambivora*, the main source of damage to Chestnut in Turkey, is discussed. It is found mainly in the east and west Black Sea areas and near the Sea of Marmara. It has not been found above 600 m. altitude and is normally found up to 350–400 m. Symptoms of the disease are discussed. There is, in addition to the German summary, a list of chapter headings in German.

2390. RHOADS, A. S. **The destructiveness of *Clitocybe* root rot to plantings of Casuarina in Florida.** *Lloydia* 15 (3), 1952 (161–84). 6 refs. P.R.

Six species of *Casuarina* planted more or less extensively in Florida are very susceptible to root rot caused by *Clitocybe tabescens.* This fungus has been shown to be a virulent pathogen capable of attacking uninjured roots of vigorously growing trees and spreading rapidly to adjacent ones. Its incidence is greatest on well drained, light sandy soils, acid in reaction and droughty in character. [Cf. *For. Abstr.* 13 (No. 1332).]

2391. RILEY, C. G. **Studies in forest pathology. IX. *Fomes igniarius* decay of Poplar.** *Canad. J. Bot.* 30 (6), 1952 (710–34 + 8 photos). 30 refs. P.R.

Decay of *Populus tremuloides* and *P. grandidentata* caused by *F. igniarius* var. *populinus* was studied at the Petawawa Forest Experiment Station, in stands up to 70 years of age. In eight $\frac{1}{10}$-acre sample plots representing stands 60–70 years old, 28·6–69·2% of the trees were infected; the % of decay in the gross merchantable cubic volume was 3·2–14·3 in the decayed trees, and 0·9–8·1 taking in decayed and sound trees together. Equally variable results were obtained in younger age classes. No relation between decay and site could be established on the basis of actual cubic volume, but when the trees were measured in board feet a slightly higher % of cull occurred on the poorer sites, owing, at least partly, to the smaller size of the trees. Net periodic increment continued to increase in the 60- to 70-year age class on favourable sites. Sporophore-bearing trees died in the 1st and 3rd years after being girdled, and by the 6th year the number of mature living sporophores had fallen to 13% of the original number. On similar trees that were felled and left intact on the ground during the same period the number of sporophores increased. Artificial inoculations in both sapwood and heartwood of living trees resulted in the development of typical decay from which the

pathogen was re-isolated. Observations on sporophores from 4 May to 30 June of the following year proved that sporulation of *F. igniarius* is continuous from early spring to late autumn. There is not necessarily any period of inactivity during which new tube layers are formed, though irregular periods of one to several days without sporulation are common. Sporulation is favoured by high relative humidity and high temperature. The lowest temperature at which sporulation was observed was 40° F. *From author's summary.*

2392. REDMOND, D. R., and ROBINSON, R. C. **Poria cocos in the Maritimes.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (5), 1952 (1).

Poria cocos was isolated from Yellow Birch suffering from butt rot. Experiments in inoculating roots of Birch seedlings with the fungus resulted in the leaves wilting and turning brown, and the root systems were found to be badly decayed. Studies continue.

2393. BAGCHEE, K. **A new and noteworthy disease of Gamhar (*Gmelina arborea* Linn.) due to *Poria rhizomorpha* sp. nov.** *Indian For.* 79 (1), 1953 (17–24 + 11 photos + 2 drawings).

A fully illustrated account of the organism, which attacks roots and stem of *G. arborea* in shady, unfavourable and water-logged sites and clay soils in eastern India.

Wilts, Diebacks etc.

2394. VAJDA, Z. Uzroci epidemijskog ugibanja brijestova. **[Causes of the mass deterioration of Elms.]** *Glasn. šumske Pokuse* No. 10, 1952 (105–97 + 7 photos+3 gphs.+1 tbl.). 65 refs. [Croat.croat.f.]

The development of the Dutch Elm disease in Croatia is studied in detail in relation to climatic factors, using as an index the deviations of Lang's "rain factor" (precipitation/temperature) from its mean value for the period March–May and June–Aug., from 1872 to 1947. The first 32 years (1872–1903) were characterized by rather cold, wet springs and summers, the next 12 years were a transition period with ups and downs of rainfall and temperature, while the last 32 years (1916–47) had predominantly warm and dry springs and summers. The author's theory of the causes of the Dutch Elm disease in Croatia is based on the following considerations. A sequence of extremely warm and dry springs and summers has had important consequences in the biology of the trees, their bark-beetles, and fungi. Owing to the constant lowering of the water-table, drying-up of the soil, and increased transpiration, the air content of the sap vessels kept on increasing; when this happened in the outer growth rings, the tree became more liable to attack by *Ceratostomella ulmi*. On the other hand, the sequence of hot and dry springs and summers favoured the reproduction of the bark beetles *Scolytus scolytus* and *S. multistriatus*, the former attaining in hot and dry years 3–4, and the latter 2 generations. These insects easily infect thin branches of Elms with *C. ulmi*. Once the fungus is established in the tree and unfavourable climatic conditions promote further infection via the insects, the Dutch Elm disease progresses at an increasing rate, particularly in young trees. The foci of the disease are usually groups of trees growing on sites where the soil has undergone a sudden change in moisture content owing to drought (e.g. lowlands along rivers and torrents).

2395. VAJDA, Z. Borba protiv sušenja brijestova. **[Control of Dutch Elm disease.]** *Šum. List* 76 (9), 1952 (326–35). 17 refs. [Croat.e.]

A comprehensive review of investigations, observations, and control measures relating to the Dutch Elm disease. No Jugoslav investigations are cited. In Croatia, all native Elm species (*Ulmus 'campestris'*, *U. effusa*, *U. montana*, and *U. procera* var. *dalmatica*) succumb to this disease which in the last 20 years has killed roughly 6,000,000 trees or ca. 2,000,000 cu.m.

2396. CRAIGHEAD, F. C., and MORRIS, C. L. **A progress report: possible importance of insects in transmission of Oak wilt [*Chalara quercina*].** *Pa. For. Wat.* 4 (6), 1952 (126–9).

2397. MORRIS, C. L., and FERGUS, C. L. **Observations on the production of mycelial mats of the Oak wilt fungus in Pennsylvania.** *Phytopathology* 42 (12), 1952 (681–2). 5 refs.

2398. FERGUS, C. L. **Oak wilt found affecting Chestnut Oak [*Quercus montana*] in Pennsylvania.** *Plant Dis. Reptr.* 36 (10), 1952 (386). A.P.B.

2399. BRINKMAN, K. A. **Oak wilt mortality in an unmanaged Iowa forest.** *J. For.* 50 (12), 1952 (941–2). [Central States Forest Experiment Station.]

A 100% inventory was made of trees killed by Oak wilt (*Chalara quercina*) in 38·6 acres of forest in Delaware County, Iowa. It was found that dead Northern Red Oak (*Quercus borealis* var. *maxima*) loses its bark early and stands for 7–8 years after death. Infested Jack (*Q. ellipsoidalis*) and Black (*Q. velutina*) Oaks generally retain their bark, decay rapidly, and fall within 5–6 years. Oak wilt losses over a period of 8 years were 11·3% of *Q. borealis*, and 13·5% of *Q. velutina* and *Q. ellipsoidalis* combined. Only 0·4% of White Oak (*Q. alba*) were killed by wilt disease. The disease was most active in trees of more than 10·5 in. d.b.h. (5 trees/acre compared with 1/acre for smaller trees).

2400. TOOLE, E. R. **Two races of *Fusarium oxysporum* f. *perniciosum* causing wilt of *Albizzia* spp.** *Phytopathology* 42 (12), 1952 (693–4).

Isolates from wilted *Albizzia procera* proved to be *F. oxysporum* f. *perniciosum* already known to cause wilt in *A. julibrissin* [cf. *For. Abstr.* 11 (No. 1462)] Isolates from *A. procera*, however, were pathogenic only to *A. procera* and not to *A. julibrissin*. A similar difference in pathogenicity was also noted in isolates from *A. julibrissin*, which did not infect *A. procera*. It is proposed that the form causing vascular wilt of *A. julibrissin* be named Toole Race 1, and that causing vascular wilt of *A. procera*, Toole Race 2.

2401. NUTMAN, F. J., and ROBERTS, F. M. **Acute die-back of Clove trees in the Zanzibar protectorate.** *Ann. appl. Biol.* 39 (4), 1952(599–608 + 2 plates). 8 refs. [Clove Research Scheme, Zanzibar.] O.R.E.

The most widespread die-back of *Eugenia caryophyllata* in Zanzibar is caused by a fungus, *Cryptosporella eugeniae* sp. nov. [cf. *For. Abstr.* 14 (No. 438)]. Symptoms and inoculation experiments are described. Symptoms could not be produced in seedlings, and rarely in plants aged 18–36 months, but were readily produced in saplings 7–10 years old. Spread of the disease is encouraged by the prevalent destructive harvesting methods. Sources of infection should be removed from plantations. Diseased parts of trees may be cut away and the wounds treated with white-lead paint.

Cankers, Stem Rusts etc.

See also Nos. 2043, 2387.

2402. ROBAK, H. Om saprofyttiske og parasittiske raser av lerkekreftsoppen *Dasyscypha willkommii* (Hart.) Rehm. **[Parasitic and saprophytic strains of *D. willkommii*.]** *Medd. Vestland. forstl. Forsøkssta.* 9 (2) (No. 29), [1952] (117–211). 15 refs. [Nor.nor.e.]

Concludes, as a result of morphological studies and studies on development in culture, that the two strains should not be given taxonomic rank as species but should be considered as races distinct in some morphological and physiological properties. [Cf. *For. Abstr.* 13 (No. 2264).] Inoculation experiments on living trees in the field showed that there is generally no danger of canker formation by infection from apothecia on dead branches and twigs. The paper is the first of a series on canker and dieback in Larch plantations in W. Norway. There is a full English summary, and legends to illustrations and tables are given in both languages.

2403. NIENSTAEDT, H. **Tannin as a factor in the resistance of Chestnut, *Castanea* spp., to the Chestnut blight fungus, *Endothia parasitica*.** *Phytopathology* 43 (1), 1953 (32–8). 25 refs.

Extracts made from the bark of (1) *C. mollissima*, (2) *C. dentata*, and (3) *C. crenata* were tested for toxicity to *Endothia parasitica*. The bark of the more resistant species, (1) and (3), contains antibiotic substances in concentrations high enough to retard the growth of the fungus. Purified tannins from the same three species were also tested in this way. Above certain concentrations they all retarded growth of the fungus, but that of (1) was by far the most toxic. Total concentration of tannins in the bark is not correlated with the relative resistance of the species. In water extracts, however, the concentrations of tannins were larger in the extracts from the resistant species. This may indicate a difference in solubility of tannins in the three species. The tannin of (1) is a pyrogallol tannin, whereas the other two species contain a mixture of catechol and pyrogallol tannin. The relative resistance of the species may be partly the result of differences in solubility and quality of their tannins.

2404. SCHÖNHAR, S. Eichen- und Roteichenkrebs in Württemberg. **[Canker of native and Red Oaks in Württemberg.]** *Allg. Forstzeitschr.* 6 (37/38), 1951 (367–9). 2 refs. [G.]

Canker caused by *Stereum rugosum* was found in December 1949 on *Quercus robur*, *Q. sessiliflora* and *Q. borealis* in two stands near Altensteig, Schwarzwald. Subsequent reconnaissance has shown that it occurs sporadically on these species over most of N.W. Württemberg, with a few occurrences on *Salix caprea*, *Carpinus betulus* and *Prunus avium*. Serious damage, however, appears to be confined to the Schwarzwald and is probably associated with the high rainfall and relatively low temperatures of that region. On present evidence, *Q. borealis* is more frequently attacked than native Oaks. The cankers usually occur at levels of 0·2–2·5 m. up the stem, and none were found in the crown; all contained or had contained a dead branch which is presumed to have afforded entry to the fungus—normally a harmless saprophyte on hardwood stumps. Control is difficult, since attack is usually advanced before it is noticed. As a preventive measure, dead branches should be pruned off close to the stem, to favour rapid occlusion. Possibly green pruning should also be undertaken, especially of branches exceeding 2 cm. in diameter. It is advisable to seal any pruning wounds with grafting wax. Early natural pruning of Red Oak should be promoted, e.g. by close spacing. Observations so far suggest that mixture of Oaks with Spruce or Silver Fir encourages canker.

2405. KESSELHUTH. Der Pappelkrebs und seine Folgen. **[Poplar canker and its consequences.]** *Forst u. Holz* 8 (1), 1953 (2–4). [G.]

Describes an attack by *Valsa sordida* on 20-year-old *Populus regenerata* in Germany. *P. robusta* growing on the same site was unaffected. [Cf. *For. Abstr.* 12 (No. 3407).]

2406. SABET, K. A., and DOWSON, W. J. **Studies in the bacterial die-back and canker disease of Poplar. I. The disease and its cause.** *Ann. appl. Biol.* 39 (4), 1952 (609–16 + 1 plate). 11 refs. [Botany School, University of Cambridge.] O.R.E.

From diseased material, colonies were isolated that closely resembled *Pseudomonas syringae*. In inoculation experiments it was found that the disease was exactly reproduced by inoculation of leaves and shoots in spring with 'natural' slime, or with the bacterium isolated from the slime together with sterile filtered slime. Only temporary lesions were produced by inoculations with the bacterium alone, and no infection was produced by filtered sterile slime alone. Leaves could be infected through the stomata and wounds, but shoots only through wounds. Infection took place only in spring and early summer. The bacterium appears to be a special form and the name *P. syringae* f. sp. *populea* is proposed for it. It is considered to be synonymous with *P. rimaefaciens* Koning. [Cf. *For. Abstr.* 13 (No. 3994).]

2407. MARCHIONATTO, J. B. *Botryosphaeria ribis*, como hongo patógeno del sauce de adorno en la Argentina. **[*B. ribis* as a pathogen of *Salix caprea* in Argentina.]** *Rev. argent. Agron.* 19 (4), 1952 (238–9). [Span.] E.M.B.

Isolations from a diseased branch of *S. caprea* in Buenos Aires showed *B. ribis* to be responsible for a

bark necrosis that kills young plants and disfigures older trees.

2408. Leppik, E. *Melampsora deformans*, ein neuer Hexenbesen bildender Weidenrost. [***M. deformans*, a new Willow rust producing witches' brooms.**] *Z. PflKrankh.* 56 (7/9), 1949 (289–90). [G.] I.I.E.

Describes a new rust fungus found on *Salix purpurea*.

Foliage Diseases

See also No. 2541.

2409. Příhoda, A. Nová choroba borovice lesní (*Pinus sylvestris*) v Čechách. (*Stagonospora pini* Grove.) [**A new disease of *P. sylvestris* in Bohemia.** (***S. pini*).**] *Lesn. Práce* 30 (4), 1951 (331–3). [Cz.cz.russ.f.]

A new disease of *Pinus aristata*, observed in 1950 in Central Bohemia, appeared also on *P. sylvestris* trees near Česke Budějovice in southern Bohemia in 1951. The disease, which manifests itself by the drying-up of needles, in whole or part, is caused by the fungus *Stagonospora pini*. [Cf. *For. Abstr.* 13 (No. 444).]

2410. Peace, T. R. **The defoliation of Pines with particular reference to *Lophodermium pinastri*.** *Scot. For.* 7 (1), 1953 (17–22).

Describes the symptoms caused by wind blast, winter cold, smoke and fumes, and fungal attack, on Scots Pine in nurseries and plantations, discusses control by spraying of defoliation caused by *L. pinastri* and the effect of provenance on fungal and other defoliation. Corsican Pine often suffers from defoliation through being planted outside its natural range but is more resistant than Scots Pine to discoloration and defoliation by natural and fungal agencies. *From author's summary.*

2411. Stambaugh, W. J. **A study of the needle cast diseases of conifers in Pennsylvania.** *J. For.* 50 (12), 1952 (944).

Four needle-cast fungi of Pines are common in Pennsylvania: *Bifusella linearis* and *Hypoderma desmazierii* are mildly parasitic on White Pine; *Lophodermium pinastri* is widespread on all Pines. *H. lethale* causes widespread defoliation and growth reduction in Pitch Pine plantations. *Rhabdocline pseudotsugae* defoliates as much as 40% of Douglas Fir in plantations. Needle-cast epidemics were found to be closely related to periods of high humidity, and trees of poor vigour are the usual victims.

2412. Stambaugh, W. J., and Bramble, W. C. **The occurrence of *Rhabdocline* needle cast of Douglas Fir in Pennsylvania.** *Plant Dis. Reptr.* 36 (7), 1952 (292–3). 3 refs. A.P.B.

R. pseudotsugae in Pennsylvania was first noted in January 1952. *Adelges cooleyi* was associated with the disease and is a possible vector.

2413. Krampe, O., and Rehm, H. J. Untersuchungen über den Befall von *Pseudotsuga taxifolia viridis* mit *Adelopus gäumanni* Rohde. [**An attack on *P. taxifolia* f. *viridis* by *A.* [*Phaeocryptopus*] *gäumanni*.**] *NachrBl. dtsch. PflSchDienst.* 6 (11), 1952 (208–12). 18 refs. [G.]

A report on an attack on coastal-type Douglas Fir in the Greifswald University forest, in which the course of the disease is described. Marked differences were observed in the resistance of individual trees to infection by *P. gäumanni*. Investigation into the microflora of the needles indicated that a secondary cause of needle-cast is probably *Botrytis cinerea*. *Pinus sylvestris* and *Picea abies* in the infected stand showed no signs of attack by *P. gäumanni*. The best method of control appears to be through the selection of resistant strains. [Cf. *For. Abstr.* 14 (No. 1946).]

2414. Příhoda, A. Houba *Sclerophoma magnusiana* Wilson et Hahn na douglasce v Čechách. [***S. magnusiana* on *Pseudotsuga taxifolia* in Bohemia.**] *Lesn. Práce* 30 (3), 1951 (257–60). 10 refs. [Cz.]

This fungus was found by the author in October 1950, on the dead needles of the previous year.

2415. Minev, K. Pepelnica na dabot (*Microsphaera alphitoides* Griff. et Maubl.) vo Kičevskiot reon. [***M. alphitoides* in the Kicevo district.**] *God. Zborn. zemj.-šum. Univ. Skopje* 3, 1951 (195–204). 8 refs. [Maced.maced.g.]

The following *Quercus* species are attacked by *M. alphitoides* in the district of Kičevo: *conferta*, *sessilis*, *cerris*, and *lanuginosa*; the last two are less attacked than the others, particularly at altitudes above 900 m. *Q. macedonica* is not attacked: nor could attack be found on Oaks infested with mistletoe (*Loranthus europaeus*).

444. VIRUS DISEASES

2416. Tokushige, Y. [**Witches' broom on *Paulownia tomentosa* L.**] *J. Jap. For. Soc.* 34 (1), 1952 (4–7). 13 refs. [Jap.e.]

[Cf. *For. Abstr.* 13 (No. 3125).] Observations were made between 1946 and 1950 on about 300 trees planted in 1944 at the Fukuoka Prefectural Forest Experiment Station. (1) The diseased trees were not found in groups and the disease did not always spread from the infected trees to the nearest healthy ones. (2) Infection ratios each year were between 10 and 15% and showed statistical uniformity within a 5% margin of error. Spread appeared to be consistent from year to year and did not seem to be particularly concentrated on young trees. (3) The stock came from 3 districts, but these showed no statistical differences in incidence of infection. (4) No relationship was found between (*a*) the slope of the field, (*b*) the g.b.h., and the incidence of infection. *From author's summary.*

2417. Miller, P. R., and Gravatt, G. F. **The Sweetgum blight.** *Plant Dis. Reptr.* 36 (6), 1952 (247–52). A.P.B.

Further notes on blight of *Liquidambar styraciflua* [cf. *For. Abstr.* 13 (No. 2276)], which has become serious in University Park, Prince George's County, Maryland, and has also been found elsewhere in Maryland and in Virginia.

2418. Ames, R. W. **Tests for Elm phloem necrosis.** *Plant Dis. Reptr.* 36 (7), 1952 (288–91). 7 refs. A.P.B.

Lindner's rapid chemical test, the $FeCl_3$ and ceric nitrate tests and Simonds and Bodine's Peach mosaic test proved useless in testing for Elm necrosis, nor were pH colour indicator tests promising. In Lindner, Kirkpatrick and Weeks' leaf-staining technique, however, diseased leaves turned dark blue after heating in NaOH solution, and turned dull red throughout after being removed and placed in the open. This technique therefore may be used to distinguish healthy from diseased Elms.

45. DAMAGE BY ANIMALS

451. *Mammals*

See also Nos. 2190–1.

2419. TURČEK, F. J. O pomere vtákov a savcov k drevinám, so zvláštnym zretel'om na semená ako potravu. **[Relation of birds and mammals to trees and shrubs, with particular reference to seeds as food.]** *Lesn. Knihovna* (*velká Řada*) No. 5, 1952 (125–66). 127 refs. [Slovak.russ.e.]

A differential table compiled by the author as a result of prolonged observations indicates which of the 49 bird and 23 mammal species considered, do damage to the roots, wood, bark, sap, seeds, buds, or branches of ca. 140 species of indigenous and exotic tree and shrub species of Czechoslovakia. The second, quantitative, part of the paper deals with several specific examples of tree damage, with particular reference to seeds; for the latter, the location (on or under the tree itself, seeds sown direct or in nurseries, or stored) and season of damage are given. The relationship between the number of seed-eating animals and fluctuations in the seed crop is also discussed. It is stressed that the eating of seeds, buds, fruits etc., is not automatically injurious, the final verdict depending on a biocoenological approach; and that control methods should comprise both technical and biological measures.

2420. JUUTINEN, P. Oravan kuusen siemensadolle aiheuttamasta vahingosta. **[Damage to Spruce seed crops caused by squirrels [in Finland].]** *Metsät. Aikak.* 1952 (8), (219–21). 3 refs. [Fi.]

Squirrels begin to feed on seed (Pine seed only when Spruce is scarce) in July and August. Taking the average of 70 stands sampled between April and November, seeds from 17·4% of the Spruce cone crop were eaten. Discounting cones knocked down by birds (chiefly crossbills) the loss due solely to squirrels is estimated at 13%. A table is given showing the number of cones knocked down by birds and other agencies on an island near Helsinki, totalling nearly 90% of all cones by late February.

2421. **Grey squirrel clubs.** *Quart. J. For.* 47 (1), 1953 (54–6).

The Ministry of Agriculture is encouraging the formation and reorganization of grey squirrel clubs with the object of keeping down the numbers of this pest. A model set of rules for such a club is given. Organized shoots are considered to be the most effective measure.

2422. ROWE, J. S. **Squirrel damage to White Spruce.** *Silv. Leafl. For. Br. Can.* No. 61, 1952. pp. 2. 3 refs.

Owing to failure of the cone crop in 1949, red squirrels [*Sciurus hudsonicus*] apparently supplemented their diet by severing and eating the terminal shoots of White Spruce. In most cases a new leader was formed and no permanent injury will result except in cases of forking.

2423. Zum Massenauftreten der Erdmaus (*Microtus agrestis* L.) in Forstkulturen. **[Outbreaks of *M. agrestis* in forest plantations.]** *Forst u. Holz* 8 (5), 1953 (62–4). 17 refs. [G.] [Niedersächsische Forstliche Versuchsanstalt, Sieber (Harz).]

Of rodents taken in the southern Harz mountains at altitudes between 300 and 700 m., 97% of those likely to damage trees were *M. agrestis*. At lower altitudes, and near cultivated fields, 41% of rodents captured were field mice and 32% *M. agrestis*. Laboratory experiments confirmed that the latter do much damage to the bark of young trees.

2424. DUSCHEK, S. Die Wildfrage in der modernen Forstwirtschaft. **[The problem of deer in modern forestry.]** *Öst. Vjschr. Forstw.* 92 (3), 1951 (147–54). [G.]

The increase in damage by deer during the last 200 years is attributed to the extermination of carnivora plus the increased planting of forest with little variety of species, few shrubs and little grass. Some figures are given of estimated financial loss and loss of timber caused by browsing and barking, for Austria and Germany. Measures recommended include fencing, protection of individual trees, cultivation in the forest of fodder crops, greater use of mixtures and of shrubs, and some reduction in size of herds.

2425. LINDEMANN, W. Untersuchungen über Verminderung von Wildschäden auf natürlichem Wege. **[Research on reduction of deer damage by natural means.]** *Z. Weltforstwirt.* 15 (5), 1952 (197–202). [G.e.f.]

In experiments in Poland in 1937–39 observations were made on damage by deer at medium population densities (red deer 1, fallow 3 and roe deer 5, per 100 ha.) within fenced test areas in softwood, hardwood and mixed forests, with and without provision of grazing sites, fodder and salt-licks. On all sites damage was greatest in winter and spring. Damage was most severe in pure softwood forests and its reduction when extra food was provided was also greatest there. Fallow deer did the most damage. Records on free range areas with comparable densities showed very much less damage, negligible in mixed and hardwood forests, than for the fenced areas. Provision of extra food reduced the damage still further. Damage from both browsing and bark stripping was always more severe in large, even-aged pure stands.

2426. EIDMANN, F. E. Wertminderung von Fichtenbeständen durch den Schälschaden des Rotwildes. **[Decrease in value of Norway Spruce stands owing to bark scaling by red deer.]** *Forstarchiv* 23 (4), 1952 (65–9). [G.]

Analyses data from 32 plots in Sauerland and the southern Teutoburger Wald which had to meet the following requirements: at least 80% of the trees, in more or less completely stocked stands, damaged by

bark scaling; stands not on butt-rot sites, 30–80 years old, of quality classes III and upwards. By comparing the actual assortments obtainable from these stands with those obtainable for hypothetical undamaged stands under otherwise similar conditions, and taking no account of probable decreases of value through loss of increment, greater liability to wind and snow breakage etc., the value of the damaged stands is found to vary from 72 to 92% of that of the hypothetical undamaged ones, and it is calculated that if all trees were so damaged in an 80-year-old Spruce stand of density 0·8, the value of the final crop would be reduced by at least 16% and that of the thinnings (estimated) by ca. 10%, the owner's loss being a minimum of DM.60/ha./year. This represents the extreme: control of the deer population should enable most of the damaged trees to be removed in thinnings. If in the example given only $\frac{1}{8}$ of the trees so removed had been scaled by deer, the loss would amount to less than $\frac{1}{10}$ of that calculated above, and would be regarded as well within what is permissible in the interests of game management.

2427. Leibundgut, H. Waldbau und Wildstand. **[Forestry and stock of game.]** *Schweiz. Z. Forstw.* 103 (12), 1952 (534–44 + 4 photos). [G.f.]

Describes the damage caused by roe deer, with which many forests in the canton of Zürich are overstocked.

2428. Aldous, S. E. **Deer browse clipping study in the Lake States region.** *J. Wildlife Mgmt.* 16 (4), 1952 (401–9 + 1 plate). B.A.P.

Some of the more important deer browse species were clipped in order to find how much browsing the trees can stand and still continue to grow. *Thuja occidentalis* under 7 ft. high will produce well and continue to grow when less than 15–20% of the foliage is removed annually. Larger trees can be browsed heavily below the 7-ft. line without serious injury. *Acer spicatum*, *Betula papyrifera*, *Prunus pennsylvanica*, *Salix* sp. and *Fraxinus nigra* can withstand moderate to heavy browsing. *Sorbus americanus*, *Cornus stolonifera* and *Sambucus racemosa* do not appear to stand up to heavy use.

2429. Cointat, M. Clôture électrique en forêt. **[Electric fencing in the forest.]** *Rev. for. franç.* 5 (1), 1953 (15–6). [F.]

Describes an unsuccessful attempt to protect plantations by an electric fence. The live wire, placed at 80 cm. from the ground, was a barrier only to the roe deer. The wild boar slid under and the red deer jumped over it. In addition it was found that batteries needed recharging every 15 days, the whole equipment deteriorated rapidly, and much damage was done by falling branches.

452. *Birds*

See Nos. 2419–20.

453. *Insects*

See also Nos. 1907 *et seq.*, 2101, 2396, 2923.

2430. Evans, J. W. **The injurious insects of the British Commonwealth (except the British Isles, India and Pakistan), with a section on the control of weeds by insects.** Commonwealth Institute of Entomology, London. 1952. pp. vii + 242. Many refs. Price 30*s*.

The material is divided into 5 sections: (1) insects of medical and veterinary importance (arranged geographically); (2) insect and crop associations (arranged under crops); (3) insect pests of agriculture, horticulture, and forestry (arranged systematically); (4) weed control by insects; and (5) special problems (plant quarantine, virus vectors, insect control, and needs for research). References are given to the first 38 volumes (1913–50) of the *Review of Applied Entomology*.

2431. Keen, F. P. **Insect enemies of western forests.** *Misc. Publ. U.S. Dep. Agric.* No. 273 (rev.) 1952. pp. 280. 163 refs. Price $1·00 (paper cover).

A revision of the work originally published in 1938, dealing with forest insect pests found in the U.S.A. west of the Rockies. [Cf. *For. Abstr.* 12 (No. 748).]

2432. Buhr, H. Über das Verhalten einheimischer Eichenparasiten gegenüber einigen Formen und ausländischen Verwandten unserer Eichen. **[The behaviour of native parasites of Oak towards some forms of German Oaks and related exotic species.]** *Mitt. dtsch. dendrol. Ges.* (*Jb. 1951/52*) No. 57, [1952?] (108–27 + 1 plate + 1 folding tbl.). 48 refs. [G.e.]

Discusses and tabulates, partly from literature and partly from the author's observations in Germany, the host selection of 15 gall-forming and 18 leaf-mining insects among 43 species of *Quercus* (sections *Phellos*, *Nigrae*, *Rubrae*, *Cerris*, *Suber*, *Ilex*, *Galliferae*, *Robur*, *Prinus* and *Dentatae*), 3 of *Castanea*, and *Fagus sylvatica*. The gall-formers are much more restricted in their hosts than are the miners. Notes are appended, for comparison, on the hosts attacked by some fungi—*Gnomonia quercina*, *Chalara quercina*, *Dothidea noxia*, and *Microsphaera* mildew.

2433. Čermák, K. Hmyzí škůdci semen našich lesních dřevin. **[Insects attacking seeds of Czechoslovakian forest species.]** *Lesn. Knihovna* (*velká Rada*) No. 5, 1952 (5–87). 90 refs. [Cz.russ.e.]

A detailed survey of insects attacking seeds only and adjacent tissues (cones, catkins etc.).

2434. Ross, D. A. **Lepidopterous pests of cones—interior British Columbia.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (6), 1952 (4).

Barbara colfaxiana taxifoliella and *Dioryctria xanthoenobares* occurred in infestation proportions over much of the range of their host trees. *Tortrix alberta*, an external feeder on cones, was very abundant, especially when *Picea mariana* cone crops were heavy. Localized heavy infestations of *Laspeyresia piperana* were apparent in several localities. Lepidopterous larvae were very uncommon in cones of *Pinus contorta*, *P. monticola*, *Thuja plicata* and *Tsuga heterophylla*, and no moths were reared from cones of these species.

2435. Cameron, J. W. M. **A survey of investigations on the diseases of insects.** *Repr.* from *82nd Annual Report of the Entomological Society of Ontario 1951* 1952 (7–14). 25 refs. (*Contr. Div. For. Biol. Dep. Agric. Can.* No. 36).

Points out the highlights of past investigations and notes some current problems and methods being used for their study, with emphasis on viruses, fungi and bacteria being studied at Sault Ste. Marie.

2436. McDonnell, C. C. **Insecticide names.** *Soap* 29 (1), 1953 (127, 129, 131, 137). P.R.

A list of common names for 45 complex organic insecticidal and 7 fungicidal chemicals, approved for labels under the U.S. Act. The names are followed by the chemical name. [Cf. *For. Abstr.* 13 (No. 4016).]

2437. Petty, B. K., and Lochner, E. H. **Comparison of fumigation, contact and stomach actions of benzene hexachloride, D.D.T., chlordan, chlorinated camphene, and parathion.** *Sci. Bull. Dep. Agric. S. Afr.* No. 302, [1950?]. pp. 12. 3 refs. Price 3*d.*

2438. Koehler, W., and Zdanowicz, Z. Wstępne obserwacje nad rozkładaniem się pyłu w drzewostanie przy opylaniu samolotami i motorami. **[Preliminary observations on the distribution of the dust in forest stands during dusting from aeroplanes or by motor dusters.]** *Sylwan* 96 (4), 1952 (488–95). 2 refs. [Pol.]

Presents results of preliminary tests. Cables were led over two pulleys attached near ground level and at the top of a pole whose height approximated to that of the surrounding stand, and glass plates coated with black lacquer were attached horizontally to the cable at 1-m. intervals. Some 15–30 min. after dusting the plates were lowered, one by one, detached from the cable, and the density of dusting determined as an average of 3 readings for 1-sq.-mm. areas. The author's general conclusions are: aerial dusting is recommended for Pine stands more than 9 m. high, because the ratio of dust retained by the crowns to that falling below them is ca. 3 : 1; for stands of lesser height, this ratio is reduced to 2 : 1, and even 1 : 1. This is explained by the fact that, apart from one culmination of dust distribution, viz. in the top parts of the crown, there always exists another culmination at a lower level, but its height, still within the crown for higher stands, is steadily reduced as the stand height decreases. Ground dustings ought to be useful for heights up to 14 m.; like aerial dusting they should not be conducted between 8 a.m. and 4 p.m. during fine weather.

2439. Itzerott, H. Eine Schnellmethode zur Prüfung der Dauerwirkung und Regenbeständigkeit von DDT- und DDT-Gamma Suspensionen. **[A quick method of testing the permanence and resistance to rain of DDT and DDT-γ[BHC] suspensions.]** *Anz. Schädlingsk.* 26 (2), 1953 (25–6). [G.]

Trial plots are sprayed and, after a certain number of days' rain, 50 dry leaf samples are taken, by means of a punch 2·5 cm. in diameter, from each plot. The samples are rinsed for 1 min. in 50 c.c. acetone. The acetone solution is poured into Petri dishes and allowed to evaporate completely. More acetone (6 c.c.) is then poured into the dishes, which are agitated to dissolve the sediment. The solution is then filtered off into test tubes and mixed with 6 c.c. distilled water. If DDT or γBHC is present, it separates out into a fine suspension and clouds the solution. The cloudier the liquid the more insecticide is present. Acetone solutions from leaf samples may also be tested against *Drosophila*.

2440. Michaelis, P. Gesundheitsgefahren bei der Schädlingsbekämpfung. **[Dangers to health in pest control.]** *Anz. Schädlingsk.* 25 (11), 1952 (161–6). [G.]

An alphabetical list of insecticides with notes on symptoms of poisoning provoked by them in humans.

2441. Mitchell, R. T., Blagbrough, H. P., and Etten, R. C. van. **The effects of DDT upon the survival and growth of nestling songbirds.** *J. Wildlife Mgmt.* 17 (1), 1953 (45–54). 5 refs. B.A.P.

Observations were made on birds nesting in boxes placed in two experimental fields, which were subsequently sprayed with DDT. Half of each field was left unsprayed. Among house wrens [*Troglodytes aedon*], which were the most numerous species in the area, only slight decreases occurred in total adult bird populations, but DDT at 3 lb./acre caused considerable mortality among fledglings. Average weight of first-brood nestlings in the sprayed area was lower than in the control area. Chemical analyses of dead birds showed a wide range in quantities of DDT present. It is recommended that DDT treatments should avoid as far as possible the breeding season of most birds.

2442. Vandenburg, D. O. **A special report on current findings in conjunction with an aerial spray of DDT in oil solutions for the control of Hemlock looper [*Ellopia fiscellaria*].** *Pa. For. Wat.* 4 (6), 1952 (134–8).

Estimated mortality of looper larvae after spraying was 52,000/acre but there was very little residual effect. Examination of streams in the area indicated that fish mortality due to the spray, was not serious. One consequence of spraying was an increase in mite populations, and it is suggested that a miticide should be added to the DDT spray.

2443. Morgan, L. S., and Kremer, R. W. **Some observations of effect on streams from the DDT spraying for Hemlock looper.** *Pa. For. Wat.* 4 (6), 1952 (138–40).

Isoptera

2444. Eliescu, G., and Langoş, G. Un atac nou la puieţii de cer. **[A new attack on Oak regeneration.]** *Rev. Pădurilor* 67 (4/5), 1952 (35–6). 1 ref. [Rum.rum.russ.]

Oak seedlings both in plantations and in the forest are atttacked and killed by the termite *Reticulitermes lucifugus*, which gnaws through the taproot. It also attacks planted acorns.

Hemiptera

See also Nos. 1908–9, 2412.

2445. Lyons, L. A. **Damage to Red Pines by the Saratoga spittlebug [*Aphrophora saratogensis*].** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (6), 1952 (1).

The damage was studied in a 13-year-old plantation of *Pinus resinosa* at Petawawa. It was found

that 64% of the trees were affected, including 3·7% killed and 31·4% heavily damaged. Adult feeding was almost confined to current year's shoots.

2446. WEIDNER. Die Fichtengallen der Douglasienlaus (*Gilletteella cooleyi* Gill.) bei Hamburg (Aphid. Chermesidae). [**Spruce galls of *Adelges cooleyi* near Hamburg.**] *Z. PflKrankh.* 56 (7/9), 1949 (291–2). [G.] I.I.E.

Galls of *A. cooleyi* have been found in great numbers on *Picea sitchensis*, *P. glauca* and *P. abies* in the Hamburg region; gall formation has previously occurred only rarely in Germany. [Cf. *For. Abstr.* 11 (No. 3334).]

2447. KOVAČEVIĆ, Ž. Uš jelova izboja—*Dreyfusia nüsslini* C.B. [***D. nüsslini.***] *Šum. List* 76 (10/11), 1952 (413–6). 4 refs. [Croat.g.]

The presence of *D. nüsslini* has been established in the Fir stands of Slovenia. The insect was probably imported from the Crimea.

2448. FLANDERS, S. E. **A parasite of the European Elm scale established in California.** *J. econ. Ent.* 45 (6), 1952 (1078–9).

Notes on the successful introduction of *Coccophagus insidiator* into California as a parasite of *Gossyparia spuria.*

Lepidoptera

See also Nos. 1910–1, 1918, 2434, 2442–3.

2449. SORAUER, P. [Edited by BLUNCK, H.] Handbuch der Pflanzenkrankheiten. Band IV: Tierische Schädlinge an Nutzpflanzen. 1. Teil. 2. Lieferung. [**Manual of plant pathology. Vol. IV: Animal pests of useful plants. Pt. 1, No. 2[: Trichoptera and Lepidoptera].**] Paul Parey, Lindenstr. 44–47, Berlin SW68. 5th ed. (rev.) 1953. pp. viii + 518. Copious refs. [G.] Price [£10. 0*s.* 0*d.*] Cf. *For. Abstr.* 13 (No. 3937).

2450. MENON, K. D. **Cossid moth [*Zeuzera coffeae*] attack on young plantation trees [in Malaya].** *Malay. Forester* 15 (4), 1952 (208–9).

This moth has been very active in plantations at Kepong, attacking young trees of *Albizzia falcata*, *Casuarina* sp., *Cinnamomum camphora*, *Eucalyptus deglupta*, *Swietenia macrophylla*, *Tectona grandis* and *Terminalia ivorensis.* Tunnels are usually ca. 1½ ft. long but may be as much as 3 ft., and when vacated are sometimes occupied by ants or termites.

2451. BECKER, G. Frass von Lepidopteren im Kambium gesunder Kiefern in Mittel- und Nordamerika. [**Damage by Lepidoptera to the cambium of healthy Pines in Central and North America.**] *Z. angew. Ent.* 34 (2), 1952 (170–7). 12 refs. [G.g.]

Larvae of an unknown species of Aegeriidae were found in the cambium of living, healthy Pines in Guatemala, at 30–120 cm. above the ground, and chiefly in the neighbourhood of bark lesions, knots, or irregularities in the stem surface. The larvae and pupae and the larval galleries are described, and details of life history, so far as known, are given. The insects were particularly common in *Pinus rudis*, but were also found in *P. pseudostrobus* and *P. oocarpa.* Their altitudinal range appears to be between 1800 and 2800 m. Populations are influenced by tachinid parasites. The trees overcome the attacks without permanent injury, and control measures are not at present necessary. Notes are included on damage by other Lepidoptera to trees in Guatemala and North America.

2452. STARK, R. W. **Analysis of a population sampling method for the Lodgepole needle miner in Canadian Rocky Mountain parks.** *Repr.* from *Canad. Ent.* 84 (10), 1952 (316–21). 5 refs. (*Contr. Div. For. Biol. Dep. Agric. Can.* No. 44.)

[Cf. *For. Abstr.* 13 (No. 4025); 14 (No. 484).] The following adequate sampling method for *Recurvaria milleri* was devised: the average number of larvae per branch tip (including 5 years' needles) is accepted as the infestation unit; 4 branch tips are taken from 2 crown levels in each tree, the average number per branch tip per tree being calculated for each crown level. In a population in Yoko National Park, to obtain results with a 10% error (computed from the standard error) 40 trees were sampled at valley bottom, 35 at the 750-ft. level, and 30 at the 1500-ft. level. Application of the variance component technique indicated that sampling fewer trees with more branch tips, or more trees with fewer tips, would give comparable results. Transformation of the data was required so that analysis of variance could be applied. There is a significant difference in degree of infestation between altitude levels, between trees at valley bottom and the 750-ft. level, and between crown levels. For practical purposes the lower-crown samples could be eliminated and the measure of the outbreak taken as the average number of larvae per tip in the more vital upper crown. Fewer trees would be required for this estimate. Progress of an outbreak could be determined by yearly investigations of this type. *Author's summary.*

2453. BECKING, J. H. Bijgroeiverlies in opstanden van Japanse lariks door sterke aantasting van het lariksmotje. [**Increment loss in stands of Japanese Larch as a result of heavy damage by *Coleophora laricella.***] *Ned. Boschb.-Tijdschr.* 24 (12), 1952 (329). [Du.]

Figures are given showing the annual increment for 1949–50, when *C. laricella* was present but damage was slight, and for 1951–2, when damage was heavy, in sample plots of Larch established in 1932. The loss is estimated at 33% for height, 47% for diameter, 68% for b.a., 58% for volume and 57% for value increment.

2454. PARMENTER, L. ***Stigmella samiatella* Zell. (Lep., Stigmellidae) as a British insect.** *Ent. mon. Mag.* 88 (1063), 1952 (286).

Leaf mines in Oak in Surrey were caused by *S. samiatella*, a species not hitherto recorded in this country.

2455. BROWN, R. C. **The Spruce budworm.** *Yearb. Agric. U.S. Dep. Agric.* 1952 (683–8).

Summary of work done in the U.S.A. towards controlling *Cacoecia fumiferana.*

2456. JAYNES, H. A., and DROOZ, A. T. **The importance of parasites in the Spruce budworm infestations in New York and Maine.** *J. econ. Ent.* 45 (6), 1952 (1057–61). 2 refs.

A report on natural control factors found in Maine during 1948–51. Tables give a summary of mortality caused by parasites at different larval stages and a comparison with the amount of parasitization found in New York. Other mortality factors are also discussed. The population cycles and the effectiveness of certain parasites in New York and Maine are very similar. *Apanteles fumiferanae*, *Glypta fumiferanae*, *Horogenes cacoeciae* and *Agria affinis* accounted for almost the same budworm mortalities in both areas. [Cf. *For. Abstr.* 13 (No. 470).]

2457. **[Protection of the forest against the Spruce budworm.]** *Rep. marit. Sect. Canad. Inst. For. 1952*, 1953 (18–47).

The report of the 1952 meeting of the maritime section of the Canadian Institute of Forestry, on the subject of budworm control, includes the following papers: Results of 4 years' large-scale spraying for the Spruce budworm on the Pacific Coast (*J. M. Whiteside*); Progress toward budworm control (*M. L. Prebble*); Airplane spraying for forest insect control (*R. C. Brown*); What is Newfoundland doing to save its Balsam forest from the budworm? (*A. M. Martin*); Effect of chemical spraying on the natural control factors of the Spruce budworm (*A. B. Baird*); The immediate results of the Upsalquitch spraying (*R. E. Balch*).

2458. MARICONI, F. A. MENEZES. As lagartas das palmeiras, A—*Brassolis sopharae* Lineu 1758, B—*B. astyra* Godart, 1821. **[The Palm tree caterpillars, *B. sopharae*, and *B. astyra*.]** *Biológico* 18 (6), 1952 (103–7). [Port.] C.G.B.

Notes on the habits and life history of the insects, the damage they cause, and their control. Where the trees are too numerous for control by hand-picking, biological methods hold most promise. Most important among the parasites are *Telenomus* sp., *Xanthozona melanopyga*, *Spilochalcis morleyi*, *S. nigrifrons* and *Spilochalcis* sp.

2459. MÜLLER-KÖGLER, E. Über eine Erkrankung der Kiefernspanner-Altraupen und Vorpuppen. **[A disease of old caterpillars and prepupae of *Bupalus piniarius*.]** *Z. PflKrankh.* 58 (11/12), 1951 (404–10). 9 refs. [G.g.] I.I.E.

Micro-organisms isolated from old caterpillars and prepupae of *B. piniarius* suffering from a disease characterized by a yellowish-green discoloration, causing heavy mortality in the pre-pupal stage, were identified as belonging to the *Bacillus fusiformis* group. Prepupae injected with the organisms showed characteristic symptoms. Other methods of infection have so far had little success.

2460. ***Selidosema suavis* (looper caterpillar).** *Rep. N.Z. For. Serv. 1951/52*, 1952 (16).

A severe outbreak of this geometrid on 16-year-old *Pinus radiata* was controlled by aerial spraying with DDT.

2461. RADULESCU, T. O noua insectă periculoasă pentru păduri: *Hyphantria cunea* Drury. **[*H. cunea*, a new forest insect pest.]** *Rev. Pădurilor* 67 (4/5), 1952 (32–4). 2 refs. [Rum.rum.russ.]

H. cunea has recently spread to Rumania from Hungary [cf. *For. Abstr.* 11 (No. 2320)]. Biology and methods of control are discussed.

2462. LÜBKE, A. Der Goldafter auf den Nordsee-Inseln. **[*Euproctis chrysorrhoea* on the East Friesian islands.]** *Z. PflKrankh.* 59 (5/6), 1952 (221–3). [G.] I.I.E.

Hippophaë rhamnoides on the sand dunes is being seriously damaged by attacks of *E. chrysorrhoea*. Attempts at control by attacking the nest with blow-lamps, by cutting out the affected part of the plants and by dusting with chemicals, have so far failed.

2463. CORLISS, J. M. **The gypsy moth.** *Yearb. Agric. U.S. Dep. Agric.* 1952 (694–8).

Reviews methods of control used in the U.S.A.

2464. Masovna pojava i suzbijanje gubara. **[The mass outbreak and control of *Lymantria dispar* [in Jugoslavia].]** [*Publ.*] *Inst. šum. Istraž., Zagreb* No. 3, 1949. pp. 144 + 6. 115 refs. [Croat.f.] Price *Din.*112.

A symposium containing: Mass outbreak of *L. dispar* (*Z. Kovačević*), in which the author discerns 3 biological races of the pest (1) coastal, feeding mainly on *Quercus ilex*, (2) Slavonian, on *Q. robur*, and (3) Macedonian, on *Q. coccifera*; Climatic conditions and the gradual outbreak of *L. dispar* in the period 1942–8 (*Z. Vajda*); Laboratory investigations on chemical control of *L. dispar* (biological tests) (*L. Schmidt*); Control of *L. dispar* by means of aircraft (*I. Spaić*) [see following abstract]; Costs of the control of *L. dispar* by means of aircraft (*B. Manojlović*); Control of *L. dispar* by destroying its broods (*I. Spaić*); 'Pantakan' [a DDT preparation] (*V. Rendeli*); and a bibliography of over 100 references dealing with the deterioration of forests in the lowlands of Slavonia.

2465. SPAIĆ, I. **Gypsy moth (*Lymantria dispar*) control by means of spraying from aircraft.** *Proc. UNSCCUR, Lake Success, 1949* 5, 1951 (66–70). [Institute of Forest Research, Zagreb.]

Experiments in spraying from aircraft with DDT in mineral oil at a rate of 0·76 kg./ha. in 1947 were not successful, concentrations presumably being too low. In 1948 spraying was done with 'Pantakan', containing 16·5% DDT in mineral oil. The forest of Western Kusara was sprayed from 5 to 10 May at a rate of 2·5 kg./ha. and the forest of Rastovica from 11 to 14 May at 3 kg./ha. In both forests, the amount of excrement on test boards decreased steadily and ceased by about the 9th day after spraying. The Luscic-Grabarge forest was left unsprayed as a control until the larvae were beginning to pupate and the forest was almost completely defoliated; it was then sprayed, from 21 to 26 May, in an attempt to prevent a further infestation in 1949, with an American product containing 20% active DDT in mineral oil, at rates of 3·0 and 3·5 kg./ha. Only a very small number of new egg nests was found in the autumn. The operations cost Din. 393/ha., 80% of this being for the insecticide. In 1949, in an attempt to reduce the cost of the insecticide, 5% and 10% concentrations of 'Pantakan' at 2·5 kg./ha. and a 10% concentration at 2·0 kg./ha. were tested. Control, though satisfactory, was less complete than in 1948

owing to the rain during May which washed the insecticide from the top leaves. Tests in which caterpillars in cages were fed on leaves from sprayed or unsprayed forests showed that toxicity of the sprayed leaves was still high after 12 days. The 1949 results indicate that the lower concentrations of 'Pantakan' at 2·5 kg./ha. give adequate control. [Cf. *For. Abstr.* 13 (No. 1382).]

2466. Spaić, I. Suzbijanje gubara aviometodom. Dopunski pokusi. [**Control of *Lymantria dispar* by means of aerial spraying. Supplementary experiments.**] [*Publ.*] *Inst. šum. Istraž., Zagreb* No. 9 1952. pp. 55 + 3. 22 refs. [Croat.croat.e.]

The cost of chemical control effected in 1948 with 'Pantakan' (a DDT preparation) being very high, tests were conducted in 1949 with less concentrated preparations. It was found that, provided the insecticide was used in the same quantity (2·5 kg./ha.), no difference in effect could be observed between preparations containing 16·5% (1948) and 10 and 5% (1949) of DDT. About 2 kg./ha. can be accepted as the lower limit of efficiency. The preparation remains effective for 6–7 days after spraying in unfavourable, and for 22–23 days in favourable conditions. Gypsy-moth larvae poisoned by DDT never recover (yet recovery was observed in some cases with *Calosoma sycophanta* and *Melolontha vulgaris*). Despite the economy allowed by decreasing the concentration of DDT in the insecticide, chemical control still costs 2½ times as much as control by destruction of broods.

2467. Maksimović, M. Ogledi gajenja *Calosoma sycophanta L.* i *Calosoma inquisitor* L. kao neprijatelja gubara. [**Experimental rearing of *C. sycophanta* and *C. inquisitor* as enemies of *Lymantria dispar*.**] *Glasn. šum. Fak., Beograd* No. 3, 1951 (183–96). 9 refs. [Serb.serb.e.]

Present results of work done in 1949–50 at the Institute for Scientific Forestry Research, Belgrade, with full biological details. *C. inquisitor* bred out less successfully, and adults and larvae ate about half the number of *Lymantria* larvae eaten by *C. sycophanta*. The author considers mass breeding of the latter predator to be possible at moderate outlay and discusses the possibilities of a control campaign in Jugoslavia.

2468. Turček, F. O populácii vtákov v listnatých lesoch pri premnožení bekyne vel'kohlavej (*Liparis dispar* L.). [**Population of birds in hardwood forests during an outbreak of *Lymantria dispar*.**] *Zpr. výzkum. Úst. lesn. ČSR* No. 3, 1949 (108–31). 31 refs. [Slovak.russ.e.]

The author computed the numbers of *L. dispar* larvae in the Oak forests of S. Slovakia during the 1947–48 outbreak and also the number of birds there. After hatching, the number of larvae in the area of the Pata forest range (near Vráble) was ca. 40,000 per tree or 24,000,000/ha., while early in June only ca. 6,000,000/ha. remained alive. The number of birds was 30/ha. of which 24/ha. ate the larvae, approximately 900 daily, or 54,000 larvae during 2 months. This figure is equivalent to less than 1% of all the larvae in the forest.

2469. Kurir, A. Eiablage der Nonne (*Lymantria monacha* L.) in den östlichen Alpen im Verlaufe der nordsteirischen Kalamität 1946. [**Oviposition of the nun moth in the eastern Alps during the 1946 outbreak in northern Styria.**] *Zbl. ges. Forst- u. Holzw.* 71 (1/2), 1949 (74–99). 13 refs. [G.g.e.]

Cf. *For. Abstr.* 11 (No. 2300).

2470. Schimitschek, E. Erwiderung auf den Artikel von A. Kurir: 'Die Massenvermehrungsgebiete der Nonne (*Lymantria monacha* L.) in Österreich von 1888–1947'. [**Reply to A. Kurir's paper on 'The mass-outbreak regions of the nun moth in Austria, 1888–1947'.**] *Zbl. ges. Forst- u. Holzw.* 71 (1/2), 1949 (100–4). 4 refs. [G.]

Cf. *For. Abstr.* 10 (No. 2266).

2471. Kurir, A. Einteilung Österreichs in Zonen hinsichtlich der Massenvermehrung der Nonne (*Lymantria monacha* L.). [**Division of Austria into zones with regard to the mass outbreak of the nun moth.**] *Zbl. ges. Forst- u. Holzw.* 71 (3), 1951 (250–3). 12 refs. [G.]

Reply to Schimitschek [see preceding abstract].

2472. Gäbler, H. Beobachtungen über den Kiefernprozessionsspinner (*Cnethocampa pinivora* Tr.). [**Observations on *Thaumetopoea pinivora*.**] *Z. PflKrankh.* 58 (3/4), 1951 (92–6). 6 refs. [G.] I.I.E.

Discusses observations made during 1949–51, and literature on biology and parasites. Preliminary experiments, suggesting that spraying the tree stems with DDT controls the migration of the caterpillars, are to be continued.

2473. Gäbler, H. Die Tachine *Carcelia processioneae* Rtzbg. als Parasit des Kiefernprozessionsspinners *Cnethocampa pinivora* Tr. [**The tachinid *C. processioneae* as a parasite of *Thaumetopoea pinivora*.**] *Z. angew. Ent.* 34 (2), 1952 (294–6). [G.]

Describes the parasite that was reared from pupae of *T. pinivora* from the Hoyerswerda forest district. In 1949–50 parasitization was 10%.

2474. Trouvelot, [B.], Grison, [P.], and Biliotti, [E.]. La prévision des infestations de processionnaire du chêne en vue de traitements chimiques. [**Forecasting outbreaks of the Oak processionary caterpillar, with a view to chemical control.**] *C.R. Acad. Agric. France* 39 (12), 1952 (486–8). [F.] A.P.B.

The season of the most effective treatment of *Thaumetopoea processionea* by chemical means is short, viz. in mid-April between the date of hatching and the first moult. The author recommends that surveys should be made in July of the year preceding treatment in order to estimate populations from nest counts during the pupation period.

Coleoptera

See also Nos. 1912–4, 2380, 2394, 2826.

2475. Rieck, W., and Vité, P. Beobachtungen über den kleinen Fichtenzapfennagekäfer *Ernobius abietis* F. (Col., Anobiidae). [**Observations on *E. abietis*.**] *Forstwiss. Cbl.* 72 (1/2), 1953 (28–37). 15 refs. [G.]

Notes on the life history and habits of the beetle, which appears to attack only the woody part of Spruce cones, and not the seeds.

2476. Kamp, H. J. Zur Biologie, Epidemiologie und Bekämpfung des Buchenprachtkäfers (*Agrilus viridis* L.). **[The biology, epidemiology and control of *A. viridis*.]** *Mitt. württemb. forstl. VersAnst.* 9 (1), 1952. pp. 42. 30 refs. [G.g.]

Gives the results of studies made in connexion with a recent outbreak in Württemberg of this buprestid, the adults of which are leaf-feeders while the larvae tunnel in the bark and outermost sapwood, the preferred host being Beech for both stages. Includes descriptions of the adult beetles and notes on swarming and adult feeding, mating and oviposition, larval life, pupation, duration of life cycle (usually 2, but in favourable conditions only 1 year), and associated and succeeding attacks by other insects. A section on epidemiology considers the conditions favouring outbreaks (successions of dry, warm summers; dry sunny sites with poor, shallow soils); mortality at various life stages; natural enemies (including some parasites recorded for the first time on this species); temporal and local incidence of outbreaks (only 3 certainly known in the past 150 years, each apparently of 4–5 years' duration with serious damage in the last 2–3 of those years, e.g. the latest outbreak seems to have originated in 1947, but serious, widespread damage was not reported until 1951); and extent of damage. The final section deals with prognosis and control. In general, the felling and extraction of infested trees, before 1 May, is recommended, along with the felling of trap trees from Mid-May onwards. In preliminary tests of insecticides, the most effective of those tried against adults and newly hatched larvae were DDT/BHC sprays and fogs, which remained effective for several weeks, though not long enough for a single treatment to cover the whole flight period of the beetles.

2477. Marinković, B. Problem propadanja česmine (*Quercus ilex* L.) u Dalmaciji. **[The death of *Q. ilex* in Dalmatia.]** *Šum. List* 76 (10/11), 1952 (403–8). 6 refs. [Croat.croat.it.]

Methods of controlling the buprestid *Coraebus bifasciatus* attacking *Q. ilex* in Dalmatia are suggested. The author believes that the natural resistance of *Q. ilex* has been lowered by the negligent treatment of the maquis in general. No improvement is to be expected unless the soil is improved, the canopy of the stand becomes dense, and the trees are adequately tended.

2478. **The Sunt [*Acacia arabica*] seed borer.** *Rep. For. Dep. Sudan Jan. 1950–June 1951*, [1952?], (44–5).

A study was made of the bruchid (*Bruchus baudoni*) that causes 60–70% or more infertility in Sunt seed. As this beetle was found alive and multiplying in stored sacks of Sunt pods, it was natural to suppose that it was essentially a pest of stored seed. Investigation, however, showed that green pods collected off trees were already infested. A study of the life history of the insect showed that the young larva cuts its way out of the egg, not downwards into the seed as do other bruchids, but from one end, and that it regularly made a long peregrination amongst the pods before settling down to boring. A maximum effect can therefore be expected from an insecticide mixed with the seed.

2479. Tomić, D. Neka zapažanja u vezi sa masovnim namnožavanjem buba listara u okolini Beograda (*Phyllodecta vitellinae* i *Plagiodera versicolor*). **[Mass outbreak of *P. vitellina* and *P. versicolor* near Belgrade.]** *Šumarstvo* 5 (6), 1952 (508–11). [Serb.f.]

Describes the life history of *P. vitellinae* and *P. versicolor* on the basis of observations made in 1952 both in the field and in the laboratory. Since 1951, these insects have been attacking plantations of Poplar (*P. canadensis*, *P. nigra* var. *pyramidalis*, *P. alba*) and Willow (*Salix alba*) in the neighbourhood of Belgrade.

2480. Turček, F. J. *Oti[o]rrhynchus irritans*—vážny škodca niektorých ihličnanov. **[*O. irritans*—an important pest of some conifers.]** *Lesn. Práce* 30 (4), 1951 (329–30). [Slovak.e.]

In May–June, 1951, young trees of *Pseudotsuga taxifolia* and *Pinus strobus* in the Kysihybli arboretum near Banska Stiavnica (Slovakia) were found to be damaged by imagos of *O. irritans* (*multipunctatus*). The wounds were 0·5–3 cm. long and 0·5 cm. wide, sometimes penetrating into the xylem; in some cases they had healed, with callus formation. Most of the wounds were on proximal parts of lateral upper branches, the branches (or the apex) dying away ca. 1 year after the attack and healing of the wound. Native Fir and Spruce were not attacked.

2481. Magdorf, R., Plate, H. P., and Knöpke, W. Starkes Schadauftreten von Graurüsslern an einjährigen Kiefernkulturen. **[Heavy outbreak of weevils on 1-year-old Scots Pine plantations.]** *Allg. Forstzeitschr.* 6 (25/26), 1951 (269–71). [G.]

Brief notes on an outbreak in 1950 and 1951, in the Dachsberg district, Grunewald, of *Strophosomus rufipes* (accompanied by *Cneorrhinus plagiatus* and *Brachyderes incanus* in much smaller numbers), chiefly on 1-year-old Pine after planting out, but also on young Larch and deciduous species. Types of damage by the adult weevils (needle and bark feeding) are illustrated. Of several insecticides tried in 1951—all applied with knapsack sprayers—the most promising appeared to be 6·5% 'Multanin-Ultra' (a combined [DDT/BHC?] insecticide) at a rate of 125 litres/ha. This preparation had a rapid initial action plus good adhesion and retention of its toxicity: weevils were not again seen in any numbers on the plants until 15 days after treatment, in spite of rainy weather. Against the larvae, which kill 1-year-old plants by stripping the root-bark, the authors suggest treating the planting holes with some BHC preparation. An editorial note points out, without suggesting any particular preparation, that better results might be obtained, and more economically, by dipping whole plants before planting out in a suitable liquid insecticide/adhesive mixture.

2482. Aničkova, P. G. Mery borjby s želudevym dolgonosikom kak sredstvo sohranenija urožaja želudeĭ. **[Control measures against *Balaninus***

***glandium* as a means of preserving the acorn crop.**] *Dokl. vsesojuz. Akad. sel.-hoz. Nauk Lenina* 17 (7), 1952 (35–6). 2 refs. [Russ.] A.P.B.

Reports briefly on studies of the biology and control of *B. glandium*. In shelterbelts on the Kamennaya Steppe, the adults emerged from the pupae in August but remained and overwintered in the soil, from which they emerged only in late April to early May of the next year. From then until mid-July, when mass oviposition on acorns began, the weevils visited flowers of fruit trees, Birch and Lime. In forests in Voronezh Province, application of 12% BHC with a tractor-mounted power-duster at rates of 20–40 kg./ha. did not give complete control of ovipositing adults (as judged by the yield of infested acorns in the crop) but did appear to increase the number of sound acorns (0–9% in controls) to 40–70%. Hand collection of fallen acorns is recommended for control of the larval stage.

2483. Šlander, J. Ne lovna debla—temveč lovna drevesa. [**Not trap logs but trap trees.**] *Gozd. Vestn.* 10 (1/2), 1952 (1–9). 15 refs. [Sloven.]

Contests a proposal by Kovačević [*Gozd. Vestn.* 9 (5/7), 1951] that the usual trap-tree methods should be superseded by trimming immediately after felling, plus dusting of stem, slash and surrounding soil with DDT and BHC preparations, so avoiding fire danger and that from beetles escaping during trimming and barking. These insecticides, the author points out, are not 100% effective on such small barkbeetles as *Pityogenes chalcographus*, and simultaneous destruction of both small and large barkbeetle species is imperative.

2484. Kovačević, Z. Proučavanje ekologije smrekova pisara (*Ips typographus* L.) i pokusi suzbijanja kemijskim sredstvima. [**Ecology of *I. typographus* and tests on its chemical control.**] *Glasn. šumske Pokuse* No. 10, 1952 (63–104 + 5 photos). 50 refs. [Croat.croat.g.]

Mass outbreaks of *I. typographus* in Spruce stands occur more frequently in the republics of Serbia, Bosnia-Herzegovina, and Slovenia, than in Croatia. Their main cause since 1947–8 has been the unfavourable climatic conditions, in particular droughts in spring and summer, with faulty forest management the next important single factor. Two full generations were observed in a mass outbreak, followed by a partial third generation (⅓ of the 2nd-generation beetles hibernated prior to breeding). The life-span of a generation varies from 18 to 90 days, depending largely on climatic conditions. The use of trap trees is discussed, great stress being laid on the timely removal of infested bark. Trials with DDT and BHC on trap trees were disappointing. Trap trees treated with aromatic DDT emulsions (in paraffin with an addition of *p*-dichlorobenzene) had more boreholes than controls.

2485. Rieck, W. Versuche zur Bekämpfung des achtzähnigen Fichtenborkenkäfers (*Ips typographus* L.) mit dem Giftfangbaumverfahren. [**Control of *I. typographus* by the poison trap-tree method.**] *Z. PflKrankh.* 56 (3/4), 1949 (104–12). 9 refs. [G.g.] I.I.E.

In experiments in the Harz, on fallen stems treated with preparations having a DDT, γ BHC or E605 [parathion] base, 205–748 beetles were killed per sq.m. of bark surface. Dusting gave better results than sprayed solutions. There was no evidence that beetles were repelled from stems so treated. A stomach poison containing 5% As was less effective than the contact poisons, possibly as a result of the very dry weather during the experimental period.

2486. Pfeffer, A. Kůrovec lýkožrout smrkový a boj proti němu. [***Ips typographus* and its control.**] *Lesn. Knihovna* (*malá Řada*) No. 12, 1952. pp. 45. 18 refs. [Cz.] Price *Kčs.*12.

A manual for forestry staff and students.

2487. Milán, M. Kůrovec smrkový na školním lesnim závodě Vysoké školy zemědelské a lesnické v Brně. [***Ips typographus* in the experimental forest of the Brno University School of Agriculture and Forestry.**] *Lesn. Práce* 31 (4), 1952 (171–5). [Cz.]

Describes the unusual occurrence of *I. typographus* in this experimental forest (altitude 200–500 m., mean annual temperature 7–8° C., annual rainfall only 600–700 mm.). The parent rock is limestone. The southern boundaries of the forest are at the same time the forest-steppe boundaries. The occurrence of *I. typographus* in various parts of the forest is probably due to unbarked logs or to the import of adults by rail. None of the stands attacked belongs to the natural Spruce area, most of the attacked Spruce stands having been planted in the *Quercetum sessiliflorae*, or rarely in the *Querceto-Carpinetum* and *Fagetum*. Details of the extent of the attack in different parts of the area are given, and the health of the Spruce trees attacked and the parasitization of the insect are discussed.

2488. Thalenhorst, W. Zur Frage der Primärpathogenität des Buchdruckers (*Ips typographus* L.). [**Primary pathogenicity of *I. typographus*.**] *Z. PflKrankh.* 56 (7/9), 1949 (262–7). 9 refs. [G.] I.I.E.

Optimum conditions for nutrition of larvae and for development without competition from other barkbeetles, occur in healthy or only slightly weakened trees, while optimum conditions for attack occur in less healthy and therefore susceptible trees. *I. typographus* can only increase in such numbers as to become a primary pathogen at a point between these two conditions of tree health.

2489. Wichmann, H. E. Rindenbrüter und Hallimasch. [**Barkbeetle outbreaks and the honey fungus.**] *Forstwiss. Cbl.* 72 (1/2), 1953 (57–63). [G.g.]

Armillaria mellea is, more frequently than supposed, the forerunner of what appear to be primary attacks by barkbeetles, and is often the centre from which outbreaks spread. *Polygraphus polygraphus* and *Ips typographus* in particular are associated with *A. mellea* infection, and the problem of their control is closely associated with that of the fungus.

2490. Neves, C. M. Baeta. Notas sobre a entomofauna florestal portuguesa. [**Notes on Portuguese forest insects.**] *Repr.* from *Boletim da*

Sociedade portuguesa de Ciencias naturais, Lisboa 4 (4/8), 1952 (4–8). 12 refs. [Port.]

(1) *Scolytus kirschi* and *Phloeosinus bicolor* were found attacking Elm and *Cupressus* sp. respectively in Lisbon. (2) Some Coleoptera, predators of Scolytidae are listed.

2491. Groschke, F. Der 'schwarze Nutzholzborkenkäfer,' *Xylosandrus germanus* Blandf., ein neuer Schädling in Deutschland. [***X. germanus*, a new pest in Germany.**] *Z. angew. Ent.* 34 (2), 1952 (297–302). 2 refs. [G.]

Describes the appearance and habits of the beetle, found in the neighbourhood of Darmstadt, and discusses possible control measures. [Cf. *For. Abstr.* 4 (127).]

2492. Schaerffenberg, B. Die Möglichkeit einer Maikäferbekämpfung mit Hilfe von Mykosen. I. *Beauveria densa* Link, ein Hauptparasit von *Melolontha* sp. [**Possibilities of cockchafer control by means of fungus diseases. I. *B. densa*, a primary parasite of *Melolontha* sp.**] *Anz. Schädlingsk.* 25 (11), 1952 (166–70). 14 refs. [G.g.]

Laboratory experiments in inoculating soils containing *Melolontha* larvae with *B. densa* showed that the progress of infection depends more on humidity than on temperature. In field experiments, in which plots were infected with spores of the fungus in a soap solution, the number of insects infected in soils rich in humus was high, even in the second and third years after infection. In sandy soils, however, the number of infected insects in the first year after inoculation was small. It can therefore be concluded that *Melolontha* populations are not controlled by this disease in the dry, sandy soils where cockchafers are often found. In the forests, however, optimum conditions for the progress of the disease exist. The disease could be encouraged by the addition of humus to poor sandy soils. [Cf. *For. Abstr.* 5 (201).]

2493. Häfliger, E. Beitrag zur Frage der Maikäferbekämpfung. [**Cockchafer control.**] *Z. PflKrankh.* 58 (5/6), 1951 (171–8). 6 refs. [G.g.] I.I.E.

The satisfactory reduction in the number of white grubs obtained in the Valais by spraying forests, orchards, avenues and single trees with DDT on the ground and from the air, is shown in graphs and tables.

2494. Doskočil, J., Landa, V., Janda, V., Novak, K., and Skuhravý, V. Hodnocení účinků pokusného leteckého poprašování proti chroustům pomocí Dynocidu. [**Results of experimental aerial dusting of cockchafers with Dynocid.**] *Sborn. čsl. Akad. zeměd.* 25 (5), 1952 (409–14). 12 refs. [Cz.cz.russ.g.] C.G.B.

Dynocid (5% DDT of Czech manufacture) [rate of application not stated] gave a poor kill of adult *Melolontha melolontha* and *M. hippocastani*, being effective chiefly against the ♂s. Most of the beetles were only temporarily crippled; dusted ♀s oviposited and their eggs were viable. The insecticide appeared to have little or no repellent action.

2495. Landa, V., Novák, K., and Skuhravý, V. Pokusy s pozemním poprašováním proti chroustům pomocí DDT a HCH. [**Ground dusting trials of DDT and BHC against cockchafers.**] *Sborn. čsl. Akad. zeměd.* 25 (5), 1952 (415–8). 12 refs. [Cz.cz.russ.] C.G.B.

In further trials in May–June 1951, using power dusters, Dynocid [see preceding abstract] again gave poor results, even at 100 kg./ha. A Soviet DDT preparation was somewhat more effective, but still inadequate. BHC (12%; German-made) applied at 50 kg./ha. gave a ca. 100% kill: even the few chafers that flew after dusting, perished later.

2496. Spaić, I. Suzbijanje grčica u rasadnicima. [**Control of cockchafer grubs in nurseries.**] *Repr.* from *Zaštita Bilja, Beograd* No. 10, 1952 (24–32). 29 refs. [Croat.croat.e.]

Presents results of field tests conducted in spring 1950 in a nursery of the Croatian Institute for Forestry Research. The following insecticides were tested: CS_2, paradichlorobenzene (PDB), 'Pantakan' (DDT), and CaC_2. CS_2 gives 100% larva kill if applied in quantities of 50 c.c./sq. m. into holes spaced not less than 0·5 m. apart; however, its toxicity to plants precludes its use in forest plantations. PDB gives a 25% kill if applied at 40–60 g./sq. m. in holes spaced 0·5–0·7 m. apart. 'Pantakan' has no effect at all in quantities of 0·66–1·32 g./sq. m. irrespective of the mode of application, nor CaC_2 in quantities up to 40 g./sq. m.

Hymenoptera

See also Nos. 1915–8.

2497. Haber, A. Próba wyjaśnienia wpływu kręgowców na populację osnui gwiaździstej *Acantholyda nemoralis* Thoms. Hym. (ze szczególnym uwzględnieniem roli ptaków). [**An attempt at explaining the effect of vertebrates on the population of *A. nemoralis* (with a special reference to the rôle played by birds).**] *Prace Inst. Bad. Leśn.* No. 85, 1952. pp. 159 + 2 tbls. 52 refs. [Pol.russ.e.]

Investigations carried out since 1948 in forests near Częstochowa showed that, in addition to the bird species mentioned in literature as enemies of *A. nemoralis*, remnants of this insect occurred in the alimentary tracts of 24 other bird species. The importance of birds as the controlling agent increases with the age and the degree of depletion of the stand. The following mammals, amphibia, and reptiles have been found to eat the insect: *Sorex minutus*, *S. araneus*, *Sus scrofa*, *Talpa europaea*, *Evotomys glareolus*, *Microtus agrestis*; *Rana temporaria*; *Lacerta agilis*, *L. vivipara*.

2498. Thalenhorst, W. Zur Kenntnis der Fichten-Blattwespen. 1. Die Nematinen des Südharzes. [**Spruce sawflies. 1. The Nematini of the South Harz.**] *Z. PflKrankh.* 59 (3/4), 1952 (110–5). 5 refs. [G.e.] I.I.E.

Larvae of *Holcocneme insignis*, 4 *Pachynematus* and 4 *Pristiphora* (*Lygaeonematus*) spp. were found on Spruce. Of these, *H. insignis*, *Pachynematus pallescens* and *Pristiphora leucopodia*, which have rarely or never been recorded on Spruce, are

described. Figures showing approximate densities in 1950 and 1951 of *Pachynematus*, *Pristiphora*, and *Gilpinia* spp. and of *H. insignis* are given.

2499. Kolubajiv, S., and Kalandra, A. Další kalamitní rozvoj pilatek (*Pachynematus scutellatus* Htg. a *P. montanus* Zadd.) na smrku v Československu v roce 1950 a boj leteckým a pozemním poprašováním proti nim. [**Further mass outbreak of *P. scutellatus* and *P. montanus* on Spruce in Czechoslavakia in 1950, and their control by aerial and ground dusting.**] *Lesn. Knihovna* (*velká Rada*) No. 5, 1952 (88–124). 20 refs. [Cz.russ.e.]

P. scutellatus was recorded in 1949 for the first time as a mass pest of Spruce stands. The analysis of ca. 55,000 cocoons sent to the research laboratory showed that, besides *P. scutellatus* and *P. montanus*, the trees were also attacked by *Lygaeonematus abietum* and *Diprion* sp. In 1949–50, the total area infested was ca. 550 ha. in Bohemia, and 5450 ha. in Moravia and Silesia. The degree of infestation ranged up to 2600 cocoons, or 958 living pupae/sq.m. It was established that complete defoliation is to be expected when the incidence exceeds 50 live pupae/sq. m. The viability of pupae was determined for both species of *Pachynematus*, the % killed by various agencies calculated, and the rôle played by various parasites and predators analysed. The attacked areas were dusted with 5% Gesarol [DDT] from 7 heavy, and 5 light aircraft, the usual dose being 50 kg./ha. It was found that Gesarol was most efficient against imagos and the youngest larvae; the larvae of subsequent stages generally died within 1–3 days, but larvae that were mature or almost so, were much more resistant.

2500. Francke-Grosman, H. Über eine bemerkenswerte Pappelblattwespe, *Stauronema compressicornis* (Fabr.) Benson. [***S.* [*Pristiphora*] *compressicornis*, a remarkable sawfly feeding on Poplar leaves.**] *Z. PflKrankh.* 58 (1/2), 1951 (20–5). 2 refs. [G.] I.I.E.

Discusses the biology of the insect and the feeding habits of its larvae. In greenhouse experiments these attacked all Poplar species present (viz. *P. regenerata*, *P. vernirubens*, *P. canescens* and some numbered hybrids) but of the Willows only *Salix viminalis* to a slight extent. In experimental gardens at Reinbek and Ahrenburg the larvae were found on *P. berolinensis* and a hybrid *P.* '*angulata* var. *missouriensis*' × *P. trichocarpa*. In the laboratory they fed readily on *P. tremula* and *P. nigra*. Damage is generally slight and control is not likely to be necessary. At Reinbek, where the attack was affecting experimental results, a single treatment with E 605f [parathion] gave complete control.

2501. Buckner, C. H. **Predation of Larch sawfly [*Pristiphora erichsonii*] by frogs.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (5), 1952 (1–2).

An investigation was made into the predation of Larch sawfly larvae by frogs (*Rana* spp.) in a Tamarack bog. It is estimated that over the period of a month during which the larvae fall from the trees, ca. 10,000/acre are consumed by frogs.

Diptera

2502. Smith, C. C. **The life-history of galls of a Spruce gall midge, *Phytophaga piceae* Felt (Diptera: Cecidomyiidae).** *Repr.* from *Canad. Ent.* 84 (9), 1952 (272–5). (*Contr. Div. For. Biol. Dep. Agric. Can.* No. 40.)

The insects described were collected from shoots of *Picea glauca* in New Brunswick and probably occur fairly generally in the Maritime provinces, though they are not sufficiently common to constitute a serious danger.

46. DAMAGE TO TREE GROWTH BY MAN

2503. Lim, J.-C. **Plant succession and soil erosion of the hilly lands in Hotien, Changting, Fukien.** *Fukien agric. J.* 12 (1/2), 1951 (51–60). 8 refs. [Chin.e.]

The forest types and associations are briefly discussed. Long-standing abuse by man has caused widespread regression and erosion.

2504. Vincent, A. B. **Logging damage to Spruce [*Picea glauca*] and Fir [*Abies balsamea*] advance growth.** *Silv. Leafl. For. Br. Can.* No. 69, 1952. pp. 4.

48. INJURIES DUE TO UNKNOWN OR COMPLEX CAUSES

See also No. 2464.

2505. **[Pole blight of *Pinus monticola*.]** *Rep. Nth. Rocky Mt. For. Range Exp. Sta.* 1952 (42–5).

(1) Field inoculations with *Leptographium* sp. over 4 years have not produced definite and consistent pole-blight symptoms; lesions on stems and roots during the first growing season after inoculation have become occluded during the next and succeeding years or have ceased to enlarge, and the associated resin flow has stopped. (2) Preliminary observations showed that in a healthy stand in an unaffected district there was a greater living root length and total number of fine feeding roots, and a lower mortality of fine feeding roots than in an early pole-blight stand or in a healthy stand in an affected district; it has not yet been determined whether this is due to environment or to the presence or absence of disease. (3) Observations on a tree-topping experiment to check progress of the blight in individual trees, revealed no apparent change in the progress of the disease after 1 year. (4) In small-scale experiments, plots to which N (NH_4NO_3), and N + Ca + B had been added, showed slightly less mortality than control plots. Plots to which Ca or B had been added showed slightly greater mortality than the controls.

2506. Hawboldt, L. S., and Greenidge, K. N. H. **Dieback of Yellow Birch and rootlet mortality in Nova Scotia.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (6), 1952 (1). 3 refs.

Excavations of Yellow Birch trees in New Brunswick between 1945 and 1950 indicated that the deterioration in Birch began in the root systems [cf. *For. Abstr.* 10 (No. 2301).] Sample trees were

excavated in October 1952 to determine rootlet condition in view of the steady general improvement in Birch since 1950. These trees bore healthy-looking foliage, and terminal growth had increased greatly, though the branch mortality of earlier years was still evident. Rootlets showed decided recovery, recognizable by growth activity and general appearances. The clumping at root-tips of what are at present assumed to be mycorrhizal colonies was much more evident than on earlier samples. During the period 1945–50 rootlet mortality in apparently healthy trees was 11–42%, but judging by the 1952 samples, such mortality represented an abnormal condition. It is now evident that the first symptoms of dieback were in the form of dead rootlets.

5. FOREST MENSURATION. INCREMENT; DEVELOPMENT AND STRUCTURE OF STANDS. SURVEYING AND MAPPING

51. SYSTEMS AND UNITS OF MEASUREMENT

See also No. 2508.

2507. WILHELMI, T. Masse und kommerzielle Vermessungssysteme der Forst- und Holzwirtschaft in Nordamerika und Grossbritannien. [**Measures and commercial systems of measurement used in forestry and the timber trade in N. America and the U.K.**] *Merkbl. Bundesanst. Forst- u. Holzw.* No. 11, 1952. pp. 23. 29 refs. [G.e.]

An explanation for German readers of the American log rules and the British Hoppus quarter-girth system.

52. MEASUREMENTS OF STEM DIMENSIONS AND VOLUME OF TREES, STANDS, FORESTS AND TIMBER

2508. GANGHOFER [Edited by MANTEL, W.] Praktischer Holzrechner: Hilfstafeln für die Forst- und Holzwirtschaft. [**Practical timber calculator: tables for forestry and the timber trade.**] Verlag der B. Schmid'schen Buchhandlung, Augsburg. 7th ed. (rev.) 1950. pp. 228. [G.]

Previous ed. 1872. The present edition contains forest mensurational tables (cubic contents of various assortments, sectional-area and cylinder tables, Bavarian volume tables (standing timber), volume tables for sawn and hewed wood, rectangular cut from given top log diam., recovery of boards from logs of given diam.); general mathematical formulae and tables (including old non-metric measures); and a few tables useful to foresters (density, hardness, compression strength and calorific value of chief German woods; seed weights and seed or plants required for given area; and miscellaneous data on minor forest products—litter, peat, sedges, tanbark, resin and stone).

521. *Diameter (Girth) and Sectional Area*

See also No. 2514.

2509. BITTERLICH, W. Die Winkelzählprobe. [**The *Winkelzahl* method [of determining basal area/ha].**] *Zbl. ges. Forst- u. Holzw.* 71 (3), 1951 (191–205). 8 refs. [G.e.]

A review, by the discoverer of the method, of its place in forest mensuration, its mathematical basis, procedure and measuring aids (relascope etc.), accuracy and possible applications. [Cf. *For. Abstr.* 14 (No. 1394).]

523. *Bark*

2510. OBALIL, Z. Srážka na kůru u bukové a javorové kulatiny. [**Bark allowance in Beech and Sycamore Maple roundwood.**] *Lesn. Práce* 30 (3), 1951 (279–86). [Cz.]

As a result of nearly 10,000 measurements, the author found that: (1) in the equation $T_k = aD + b$ (where T_k is the double thickness of bark, D — the diameter of roundwood, a and b — constants), the regression coefficient, a, is greater for Sycamore Maple than for Beech; (2) the equation for Beech (diam. 15–89 cm.) is $T_k = 0{\cdot}22207D + 2{\cdot}79$ (cm.), while for Sycamore Maple (Slovakia) it is $T_k = 0{\cdot}26771D + 4{\cdot}82$ (cm.); (3) slightly different relationships were found for the basal and upper parts of the tree, taken separately. It is admissible for Beech roundwood to take 1 cm. as the bark allowance for log diameters up to 49 cm., and 2 cm. for diameters of 50 cm. or more. Further research is required to establish practical figures for Sycamore Maple.

524. *Determination of the Volume of Trees and Stands*

524.1. Principles of Volume Determination. Form (Taper).

See also No. 2541.

2511. DISESCU, R. Variaţia indicelui de formă la molid în condiţiunile de creştere din ţara noastră. [**Form factors for Larch growing in the conditions found in Rumania.**] *Rev. Pădurilor* 67 (3), 1952 (15–8). 7 refs. [Rum.rum.russ.]

As a result of a study of 4131 trees, the author recommends the adoption of a form factor of 0·66.

2512. RADONJIĆ, M. Prilog izučavanju oblika bukovih stabala. [**The form of Beech stems.**] *God. Zborn. zemj.-šum. Univ. Skopje* No. 3, 1951 (247–66). 5 refs. [Croat.croat.g.]

Presents the results of stem analyses of 50 standing trees in the Kara Orman experimental forest, 25 km. N. of Lake Ohrid. The stem diameter was measured at intervals of 10 cm. from the ground to a height of 250 cm., thus obtaining for the stem 25 paraboloidal frusta. The general equation of parabola, $y^2 = px^r$, has $r > 2$ (the stem curve being convex to the stem axis) up to a height of 120–160 cm.; above this the stem curve is concave. The exponent r has the greatest value (ca. 65) at the butt end, and the smallest (ca. 0·65) at 250 cm. height. Thin stems

are more cylindrical from a height of 40 cm. upwards than thick stems.

2513. STOJANOVIĆ, O. Tablice pada prečnika i zapremina za bukvu sa Majdanpečke domene. **[Taper and volume tables for Beech from the Majdanpek Estate.]** *Glasn. šum. Fak., Beograd* No. 5, 1952 (55–73). 3 refs. [Serb.g.]

The tables have been worked out in accordance with Tjurin's method [A. V. Tjurin, *Forest mensuration*, 2nd ed., Moscow, 1945] on the basis of 33 complete stem analyses and 29 external measurements, and give the diam. at 2-m. intervals and volumes for 2-m. stem sections, for 2-cm. diam. classes between 6 and 50 cm. and 3-m. height classes between 6 and 33 m. The paper also contains an analysis of the relationship of four form quotients with total height and with each other.

524.3. Volume of Tree Groups and Stands

See also No. 2513

2514. VUOKILA, Y. Havaintoja puiden luvussa syntyvistä virheellisyyksistä. **[Observations on inaccuracies in calipering trees.]** *Metsät. Aikak.* 1952 (12), (357–8). [Fi.e.]

A study was made in 18 sample plots on the errors in volume resulting from inaccurate determination of breast height; the volume of standing trees was determined by Ilvessalo's volume tables [see *For. Abstr.* 10 (No. 777)]. Trees were calipered at 1·0, 1·3 or 1·5 m. Generally, calipering at 1 m. gave an average error of 3·8% in the stand volume, and measurement at 1·5 m. an opposite one of the same magnitude. This means that a systematic error of 10 cm. in the measuring height causes an average error of 1–2%. On one sample plot of exceptionally poorly-formed stock, however, the volume error was 22·6% when diameters were measured at 1 m.

2515. ZIMMERMAN, A. H., and POTTS, S. M. **Cedar [*Juniperus virginiana*] volume tables for the Tennessee Valley.** *Tech. Note Tenn. Vall. Auth.* No. 8, 1952. pp. 1 + 4 tbls.

2516. BLYTH, A. W. **White Spruce standard volume tables for the boreal and sub-alpine regions of Alberta.** *Silv. Leafl. For. Br. Can.* No. 60, 1952. pp. 6.

2517. BAUGER, E. Kubikktabeller for stående furuskog på Vestlandet. **[Volume tables for standing Scots Pine forests in W. Norway.]** *Medd. Vestland. forstl. Forsøkssta.* 9 (2) (No. 29), [1952] (215–37). 7 refs. [Nor.e.]

2518. STOFFELS, A. De inhoudsbepaling van grovedennen-opstanden met behulp van standard-krommen. **[Determining the content of Pine stands using standard curves.]** *Ned. Boschb.-Tijdschr.* 25 (2), 1953 (29–42). 38 refs. [Du.f.] (*Korte Meded. Bosbouwproefsta. T.N.O., Wageningen* No. 14.)

Discusses different methods of determining stand volume, particularly the use of standard curves. In 26 even-aged Scots Pine stands, volume/diameter regression curves were studied, using the equation $v = \alpha d^{\beta}$ where v = volume, d = diameter, and α and β are constants. As a result of this study and of previous studies in Holland, β was found to equal 2·20, giving the new equation $v = \gamma d^{2 \cdot 20}$. To obtain a regression between γ and the calculated data $\bar{d}$ (mean diameter) and $\bar{h}$ (mean height), the equation $\gamma = p\bar{d}^{q}\bar{h}^{r}$ was used, (p, q and r being constants) and measurements on the 26 stands gave

$$\gamma = 0 \cdot 501 \bar{d}^{-0 \cdot 268} \bar{h}^{+0 \cdot 865}$$

The individual volume/diam. curves are identified by numbers which are the values of γ, multiplied for convenience by 5. An auxiliary table gives the appropriate curve numbers against values of $\bar{d}$ and $\bar{h}$. The main tables then show for each curve the stem volume (cu.m.) against diam. alone. An example of the practical use of the method is given.

2519. LOETSCH, F. Der Einfluss von Höhenstufen und Holzarten auf einen einheitlichen Massentarif bei mitteleuropäischen Waldvorratsinventuren. **[The influence of height classes and species on a uniform volume table for central European forest inventories.]** *Z. Weltforstwirt.* 15 (5), 1952 (185–96). 14 refs. [G.g.e.]

The diversity of regionally developed volume tables in central Europe is discussed and the need for a uniform basis to permit comparison of results over larger areas is stressed. A grouping into 10–20 height classes was shown to give the most accurate results, but differentiation by species did not appear to be necessary, only correction factors.

524.4. Recording of Data. Organization of Measuring Parties and Their Work

2520. SPURR, S. H. **Index cards for tree records.** *Minn. For. Notes* No. 11, 1952. pp. 2.

Illustrates two standard, printed index cards for keeping growth records of individual trees.

524.6. General Surveys of Forests and Whole Tracts of Forest. Partial Enumeration Surveys, Timber Cruising

2521. LOETSCH, F. Entwicklungsmöglichkeiten mitteleuropäischer Holzvorratsinventurmethoden. **[The possibility of improving methods of making forest inventories in central Europe.]** *Z. Weltforstwirt.* 15 (2), 1952 (41–57). 57 refs. [G.e.]

The variety of methods used in different parts means that figures for a large area are insufficiently comparable. Statistical and mathematical methods used in Sweden and the U.S.A. based on line-plot and random sampling respectively are discussed.

2522. KINASHI, K. **[Forest survey by a sub-sampling method.]** *Trans. 59th Mtg. Jap. For. Soc.* 1951 (48–50). 2 refs. [Jap.e.]

Describes the application of a random sub-sampling method to stratified random samples (two per stratum) in an actual forest.

525. *Volume by Assortments. Merchantable Volume*

See also Nos. 2286, 2381–2, 2391.

2523. CHASE, C. D., and GEVORKIANTZ, S. R. **Volume in tops and limbs of sawlog trees.** *Tech. Note Lake St. For. Exp. Sta.* No. 390, 1953. pp. 2.

Two tables are given, a simplified one for use when height data are available only for the sawlog part of the stem and the other when both total height and the usable height above the sawlog part are known.

526. *Log Measurement. Scaling*

See also No. 2527.

2524. TAKASE, G. [**Formulae for calculating log volume.**] *J. Jap. For. Soc.* 34 (2), 1952 (56–60). [Jap.e.]

Various formulae for calculating the volume of logs were applied to 292 logs of Sugi [*Cryptomeria japonica*] 4 m. long. It is concluded that the formulae used in the past need some modification when applied to Sugi.

527. *Solid Volume of Stacked Products*

2525. OBALIL, Z. Otázka změny prostorového objemu a převodních čísel rovnaného dříví vlivem spojování jednometrů ve větší prostorové hranice. [**The change in stacked volume and in conversion factors for stacked wood, due to the merging of one-cu.m. stacks into larger ones.**] *Zpr. výzkum. Úst. lesn. ČSR* No. 3, 1949 (159–69). [Cz.russ.e.]

Czech findings are that stacked volume (Spruce pulpwood) decreases when 1-cu.m. stacks are merged into larger stacks; consequently, the respective conversion factors increase, viz. for 2-cu.m. stacks by 0·5%, and for 10-cu.m. ones by 1·5%, as compared with 1-cu.m. stacks.

53. SPECIAL MEASUREMENTS OF TREES AND STANDS (CROWN DIMENSIONS, STAND DENSITY ETC.)

See also Nos. 2528, 2531–2.

2526. PREDESCU, G. Contribuţiuni la lămurirea noţiuni de 'consistenţa'. [**An attempt to clarify the various conceptions of stand density.**] *Rev. Pădurilor* 67 (3), 1952 (11–5). 5 refs. [Rum.rum.russ.]

Explains and discusses the various indices of stand density commonly used (canopy density %, relative illumination, number of trees/unit area, basal area, volume) and concludes that for management purposes, basal area is the most accurate and convenient.

2527. MIRKOVIĆ, D. Određivanje zbira omotača (plaštova) pri premeru trupaca. [**Determination of the total area of the curved surface of measured [barked] logs.**] *Glasn. šum. Fak., Beograd* No. 5, 1952 (23–34). 1 ref. [Serb.g.]

Two semi-empirical formulae are suggested for a population of logs. viz. $S = 3{\cdot}0631\ d_m L$, and $S = 3{\cdot}9\ V/d_m$, where d_m is the weighted mean diameter of the logs, L their total length, and V their total volume. Auxiliary tables give the values of $3{\cdot}0631 d_m$ and $3{\cdot}9/d_m$ for d_m from 20 to 60·9 cm. The results are claimed to be accurate to $\pm 2\%$.

54. ASSESSMENT OF SITE QUALITY

See also Nos. 1867, 1875, 1888–9, 1997, 2532, 2542.

2528. BEDELL, G. H. D., and MACLEAN, D. W. **Nipigon growth and yield survey.** *Silv. Res. Note For. Br. Can.* No. 101, 1952. pp. 49. 11 refs.

The Forestry Branch undertook investigations in N.W. Ontario to test the feasibility of growth and yield determination by the stand density yield method [cf. *For. Abstr.* 9 (No. 1946)]. The site classification used was an adaptation of a classification of basic soil sites drawn up by G. A. Hills [cf. *For. Abstr.* 12 (No. 832)]; this proved very satisfactory as the various types are readily recognized in the field and lend themselves to mapping from air photos. Site indices based on the dominant height/age relationship at 100 years are given for the common species. It was found that Black and White Spruce, Balsam Fir, and White Birch attain maximum height growth on moist loams and clays, but Jack Pine develops better on somewhat drier, and Trembling Aspen on somewhat wetter soils. Base yield curves for both total and merchantable volumes, illustrating the relative productivity of the different site types are given. The plots will be remeasured after 10 years and a basis for predicting changes in density and composition of stands will then be presented. *From author's summary.*

2529. DOMES, N. Untersuchungen über Waldweide: III–IV. Die klimatisch bedingten Höhenzonen der forstlichen Standortsbonitäten im Gebirge: 2. Teil: Die Buche. 3. Teil: Die Lärche. [**Investigations on forest pasturage: III-IV. The climatically conditioned altitudinal zones of forest quality classes in the mountains: Pt. 2: Beech. Pt. 3: Larch.**] *Zbl. ges. Forst- u. Holzw.* 71 (1/2), 1949 (55–73). 10 refs. [G.e.]; 71 (3), 1951 (206–20). 8 refs. [G.]

Pt. 2—A study on the same general lines as its predecessor on Norway Spruce [see *For. Abstr.* 10 (No. 3017)], including comparisons of Beech quality classes in different altitudinal zones with the quality classes of Spruce and of alpine pasture in those zones. The English summary covers the 3 papers in this series to date. Pt. 3—Includes comparisons of Larch quality classes with those of Spruce, Beech and alpine pasture in the various zones.

56. INCREMENT, DEVELOPMENT AND STRUCTURE OF STANDS

See also Nos. 2108, 2120, 2124–6, 2162, 2187, 2196, 2225–30, 2520, 2528.

2530. HAMPEL, R. Eine Zuwachshypothese auf physiologischer Grundlage. [**An increment hypothesis on a physiological basis.**] *Zbl. ges. Forst- u. Holzw.* 71 (3), 1951 (163–78). 17 refs. [G.g.e.]

Develops, and tests on Guttenberg's Spruce yield tables with satisfactory results, a growth law expressed in the formula $M' = ah^n\ (b-h)$, where M' = current volume increment, h = stand height, and the remaining symbols are constants—a attempting to express annual duration of stoma opening; b, max. attainable stand height; and n, crown development (number of stomata). The basic assumption is that these factors express transpiration, which in turn is proportional to assimilation.

2531. BAKER, F. S. **Stand density and growth.** *J. For.* 51 (2), 1953 (94–7).

Measurements were made in roughly even-aged stands of Ponderosa Pine about 30 years old that had originated by natural seeding on over-grazed

grassland. Density varied from over 2000/acre close to the parent stand to ca. 10/acre at the farthest point from it. The results indicate that for Ponderosa Pine on this site, densities per acre varying from 130 well spaced trees to 2000 trees naturally spaced, yield virtually the same gross annual increment at 30 years. Regardless of density, the diameter growth of the small trees (due largely to grouping) is small, but as the density decreases, the number of primary trees increases and the time taken to reach merchantability is greatly changed. Differences in height growth due to density of stocking in closed stands were small and of doubtful significance. The best of the open-grown trees, however, were slightly superior in height growth as well as being much superior in diameter growth.

2532. SHEPHERD, R. F. **Ecological studies of the Spruce budworm.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 8 (6), 1952 (2–3).

As part of an ecological study of the Spruce budworm in *Abies lasiocarpa/Picea glauca* stands, growth measurements were made on trees ranging, from 5 to 22 in. d.b.h. on 4 plots in Kootenay National Park, Alberta. The results suggest that the radial growth of Spruce is controlled first by site quality, secondly by crown class, and thirdly by individual crown density. Age and diameter were too closely related to crown class for their individual effects to be isolated. Radial growth of Fir, on the other hand, is apparently controlled first by age and secondly by site quality, with little correlation with crown class or individual crown density. At the beginning of the season, 28 May–8 June, there was an appreciable initial swelling with a subsequent shrinkage, before true growth began.

The terminal growth of the saplings seemed to be controlled first by individual crown density, secondly by the degree of shading, and thirdly by site quality. Terminal growth began almost simultaneously on all plots. Moisture conditions seemed to govern the length of the growing season.

2533. GIBBS, J. A., and LANE, K. **Slash Pine planting makes remarkable growth.** *J. For.* 50 (11), 1952 (837–9).

Measurements made during the removal of a 14-year-old plantation of *Pinus caribaea* for road construction, showed excellent yields of pulpwood and posts. A comparison of volume estimated by basal-area method and actual volume measured after felling showed that the estimate was below actual volume in all cases.

2534. PRATT, E. R. ***Populus eugenei.*** *Quart. J. For.* 47 (1), 1953 (28–32 + 3 photos).

Further data on increment of *P. eugenei.* [Cf. *For. Abstr.* 12 (No. 1045).]

2535. GONET, B. Zagadnienie wieku rębności w uprawach topolowych dla produkcji drewna celulozowego. **[The problem of felling age in Poplar pulpwood plantations.]** *Sylwan* 96 (4), 1952 (387–433). 29 refs. [Pol.pol.russ.e.]

Stem analyses of 14 trees belonging to 5 Poplar species and hybrids have revealed a great variability of increment both between species or hybrids and within a species or hybrid. The c.a.i. culminated: (1) for height, between 5 and 10 years in trees No. 13 (*P. deltoides*) and No. 6 (*P. canescens*), and between 15 and 20 years in trees No. 2 (*P. alba*) and No. 7 (*P. berolinensis*); (2) for d.b.h. at 5–10 years in tree No. 13, while in trees No. 4 and 5 (both *P. canescens*) it had not yet culminated at the age of 25–30 years. The maximum volume c.a.i. is estimated at over 31 years, the culmination for plantations and free-growing trees being different from that for stems in forest stands. The *P. deltoides* trees show the greatest, and *P. canescens* the least value, the ratio of the former to the latter exceeding 5 to 1, at 20 years. *P. tremula* has been withdrawn from comparison; it shows 2 maxima of volume c.a.i., at 10–15 and 25–30 years, whereas its diameter c.a.i. culminates at ca. 30 years. *P. canescens* has a volume increment smaller than that of *P. alba* and greater than that of *P. tremula.*

561. *Increment in Height, Diameter, Basal Area, Form and Quality. Variations and Trends; Dendrochronology*

See also Nos. 2036–7, 2340, 2539.

2536. MEYER, W. H. **Get a rope.** *J. For.* 50 (12), 1952 (941).

A simple and effective device for operating an increment borer with a minimum of effort is to insert it in the bark, then take a piece of stout rope, preferably ¼-in. sash cord, 7 ft. or more long, pass it round the tree and secure it tightly in a bow-knot over the handle of the borer. The borer is then rotated without application of pressure but taking care to keep it running true without wobbling. The rope twists itself round the shaft of the borer and soon produces a great pressure of the borer against the tree. As soon as the operator feels that the bit has sunk into the wood he releases the bow knot and proceeds with the boring as usual. By using this method on trees difficult to bore, the output per day can easily be doubled and fatigue lessened simultaneously.

2537. GHENT, A. W. **A technique for determining the year of the outside ring of dead trees.** *For. Chron.* 28 (4), 1952 (85–93).

The method proposed involves visual inspection of the agreement between plotted ring measurements from living and dead trees, with a best-fit test that allows probability values to be assigned to the points selected and hence an unbiased choice.

2538. DILS, R. E., and DAY, M. W. **The effect of precipitation and temperature upon the radial growth of Red Pine.** *Amer. Midl. Nat.* 48 (3), 1952 (730–4).

Presents 3 years' May–September data, using a dial-gauge dendrometer, averaged from 10 representative trees in a 22-year-old *Pinus resinosa* plantation. The amount of radial growth appears to depend on the presence of surplus soil moisture; no correlations with temperature could be established, save in the initiation of seasonal growth. Any period of 10–14 days without rain usually brought a slackening of growth.

562. *Volume Increment*

See also No. 2542.

2539. Leibundgut, H. Beitrag zur Anwendung und zum Ausbau der Kontrollmethode im Plenter- und Femelschlagwald. [**A contribution to the application and development of the 'méthode du contrôle' under the selection and irregular shelterwood systems.**] *Schweiz. Z. Forstw.* 104 (1/2), 1953 (32–41). 9 refs. [G.f.]

The author recommends the establishment of temporary sample plots within the divisions of the selection forest, for the more exact study of production. He attaches great importance to the analysis of both volume and value increment of certain species. At the same time, inventories of growing stock ought to take account of variations in timber quality. An example of how to obtain approximate comparisons of quality increment in different divisions of the forest is given.

2540. Kuusela, K. Mahdollisuus erotusmenetelmän käyttämiseksi kasvunlaskennassa. [**The possible use of the differential method in growth calculation.**] *Metsät. Aikak.* 1952 (8), (209–11). 2 refs. [Fi.e.]

The method is based on the use of Finnish volume tables for standing trees, so that diameter and diameter growth at 6 m. must be known as well as growth figures for height and d.b.h. The volume of the average tree can be found from the volume tables once height, d.b.h. and taper class based on the difference between diameter at b.h. and at 6 m. are known. When the increment of tree height and the 2 diameters are known it is possible to work out the relative composition of diameter and taper classes that has formed the tree concerned during the period of observation. The final calculation is performed by deciding on the transfer of trees from their present diameter and taper classes on the basis of their past growth rate.

566. *Yield Tables and Their Construction*

2541. Zimmerle, H. Ertragszahlen für Grüne Douglasie, Japaner Lärche und Roteiche in Württemberg. [**Provisional yield tables for 'green' Douglas Fir, Japanese Larch and Red Oak in Württemberg.**] *Mitt. württemb. forstl. VersAnst.* 9 (2), 1952. pp. 44. 20 refs. [G.g.]

Tabulates the areas under each of these species in Württemberg and gives provisional yield tables and graphs, without distinction of site quality classes, emphasizing that the data are at present inadequate and that all the plantations have still to complete their first rotation, none yet exceeding 70 years of age. The section on Douglas Fir also tabulates tentative figures for the loss of increment caused by the Swiss needle-cast disease. That on Red Oak compares form quotients for this and native Oak.

568. *Other Mensurational Studies of Stand Constitution and Changes therein. Distribution of Growth by Tree Classes etc*

See also Nos. 2089, 2118.

2542. Mitscherlich, G. Der Tannen-Fichten-(Buchen)-Plenterwald: eine ertragskundliche Studie. [**The Silver Fir/Spruce/(Beech) selection forest: an increment and yield study.**] *SchrReihe bad. forstl. VersAnst.* No. 8, 1952. pp. 42. 48 refs. [G.g.]

A study based on 12 selection-forest plots established by the Badische Forstliche Versuchsanstalt in the 1880's, plus some supplementary plots laid out in 1950 in both selection and regular high forest, bringing the total now under observation and comparison to 17 selection and 10 high-forest plots. All are in the southern Schwarzwald (altitude 700–1000 m., annual precipitation 1700–1900 mm.). The chief sections deal with: (1) Dynamics of stand constitution and composition (past management as a cause of fluctuations; distribution of volume by diameter gradations; the selection-forest equilibrium and the calculation of fellings necessary to maintain it; variations in stocking, composition and height, accompanying the variations in diameter classes; and age). (2) Calculation of increment from empirical tables (increment of the individual tree and the calculation of increment for selection forest on medium sites; site-quality assessment; allowance for site quality in increment estimation; estimation of volume increment versus *méthode du contrôle*). (3) Optimum growing stock. (4) Comparison of selection with regular high forest (volume and value yields; crown development and increment).

(1) Ideal selection management is rarely attainable; in particular, external crises result in periodic over-felling in the highest diameter classes. This encourages regeneration and overstocks the lowest diameter classes, and efforts to compensate for the over-felling now restrict regeneration until the younger classes begin to mature and are opened up by fellings. Hence the manager propagates wave-like variations in stand structure that may last for decades and may be perpetuated by succeeding crises. Though maintenance of the selection-forest equilibrium, in which fellings are balanced by successive recruitment throughout the scale of diameter classes, sets limits to the manager's freedom of action, there may be many different solutions of the equilibrium condition as regards diameter-class distribution, which will depend on the aim of management as well as on diameter increment, and this will be reflected in the amount of growing stock, which may also be adjusted within limits. Variations in composition as between Silver Fir and Spruce (the proportion of Beech was unimportant) were found to be caused by varying conditions for regeneration rather than preferential felling. Height/diameter curves displayed periodic changes related to the cycles of over-felling and regeneration: they were practically independent of age, and stem analyses indicated that the length of the suppression period had practically no effect, suppression neither diminishing nor increasing the growth energy of Fir and Spruce.

(2) Using 3 diameter classes—(*a*) 7–25 cm. d.b.h., (*b*) 26–49 cm., and (*c*) 50 cm. and over—a table is compiled which relates the m.a.i. in diameter, b.a. and volume of the individual (average) tree of each species in each class to degree of crown suppression, expressing overhead suppression by the number of trees/ha. in higher diameter classes, and lateral suppression by that of trees in the same diameter

class. An attempt to demonstrate any effect of root competition by the same method, expressing this factor by the number of trees/ha. in lower diameter classes, gave no significant result. The increment of (*a*) proved to be affected only by overhead, that of (*b*) by overhead and lateral, and of (*c*) only by lateral suppression. For class (*b*) a further table gives ratios expressing the relative effects of overhead and lateral suppression on each type of increment of each species. These tables assume a medium site quality, for which the increment of whole selection-forest stands can then be calculated directly. The only suitable means of distinguishing site quality classes appears to be the diameter increment of (*c*), and a table of such 'DZ' (*Durchmesserzuwachs*) quality classes is compiled. It is noted that only repeated estimations of site quality in successive enumeration periods, can give exact results for selection forest. Nevertheless a close relation exists between volume increment and 'DZ' quality class, and a table is given of % corrections, by 'DZ' classes, to be applied to the volume-increment figures found from the preceding tables. The advantage of this method of estimating volume increment, compared with the *méthode du contrôle*, is that it uses the actual tree number and species representation at the start of a working-plan period and is less liable to errors arising from variations in weather, being based on the average of ca. 60 years' observations. These remarks, however, apply to the forecasting of increment; the *méthode du contrôle* remains indispensable as a check on the results of management and to determine past diameter increment, needed as a test of equilibrium and for the assessment of site quality.

(3) This section contains graphs illustrating the relations between number of trees/ha., volume increment and its value, and standing volume, in the 3 diameter classes. These can be used to find (*a*) the optimum diameter class distribution with regard to current prices; and (*b*) whether a stand, assuming average increment, is in equilibrium, and in what direction its constitution may need to be changed to attain maximum productivity.

(4) Though the volume increment of selection forest appears perhaps slightly inferior to that of regular high forest in the same region, its yield of large timber is far superior, and consequently—depending on the assortments produced—the average price/cu.m. may exceed that for regular high forest by 14–28%. In this region, and with the prices at the time of writing, selection forest has a clear economic advantage.

Some general remarks, chiefly on silvicultural matters, conclude the paper. A postscript reports a later tendency for the prices of large timber to drop, and emphasizes that any large drop would seriously diminish the economic advantage of selection over regular high forest.

2543. Vanselow, K. Was leisten die einzelnen Baumklassen an Massenzuwachs? **[What do the individual tree classes contribute to volume increment?]** *Allg. Forstzeitschr.* 6 (31/32), 1951 (313–7). 8 refs. [G.]

Briefly reviews data having a bearing upon the diameter, b.a. and volume increment of individual Kraft tree classes and their contribution to total stand increment. Stresses the close correlation between d.b.h. and tree class, and the difficulties arising in exact studies from the subjective element in the allocation of trees to tree classes, and gives a summary of the author's studies based on Bavarian sample-plot data. Since it is only for the last 25 years or so that these have included records of tree classes, the author examines the distribution of *Derbholz* [timber over 7 cm. diam. at top end] volume increment over 5 diameter groups of equal stem number, i.e. each including 20% of the total number of trees in the stand. These correspond sufficiently closely to the Kraft classes, and actually provide a more objective basis of study. The data quoted and given in tables and graphs refer to Norway Spruce, Scots Pine and Beech sample plots selected for development as undisturbed as possible, and all subjected to moderate low thinnings. The % contributions of groups I–V (in descending order of diam.) to the total *Derbholz* increment were: Spruce (from 25 to 70 years old)—48, 27, 13, 10, 2; Pine (41 to 73 years)—43, 24, 15, 11, 7; and Beech (93 to 130 years)—35, 24, 19, 16, 6. Groups I and II thus make up respectively for the 3 species 75, 67 and 59% of the timber increment, leaving no doubt that the predominants and dominants are the chief contributors. If in a Spruce stand classes III–V (60% of the number of trees) were removed *in toto*, the *Derbholz* increment would be reduced to the same extent as by removing 10% of the trees, proceeding from the highest diameter downwards. From this point of view, removal of the smaller trees in thinnings has scarcely any effect on *Derbholz* increment, especially as moderate low thinning removes less than 10%, and even heavy low thinning or high thinning from above scarcely more than 20%, of the tree number. It does mean, on the other hand, that special reasons (disease etc.) must exist before removal of trees in the upper canopy is justifiable, and it is to the well-being of this component that tending should be directed. Retention of the co-dominants should be determined by the need for a reserve against losses in the higher classes, and retention of dominated trees by the needs for soil protection etc.

2544. Clark, M. B. **A preliminary study of the growth and development of some Douglas Fir/Ponderosa Pine types.** *Tech. Publ. B.C. For. Serv.* No. *T*38, 1952. pp. 39. 7 refs.

58. SURVEYING AND MAPPING (INCLUDING AERIAL SURVEYS)

2545. Robinson, J. M. **The dot-reading overlay for the measurement of map areas.** *For. Air Surv. Publ. For. Br. Can.* No. 8, 1952. pp. 2.

The Canadian Forestry Branch has prepared 4 transparent overlays with equally spaced dots (each dot representing a known area), to give measurements in acres or sq. in. for various map scales. This method is quicker and cheaper than planimetering.

2546. Heath, G. R. **Simple devices aid use of aerial photographs.** *J. For.* 51 (2), 1953 (125–7).

Describes the design and use of 3 home-made devices for photo-interpretation: (1) a magnifying mirror stereoscope, (2) a binocular stereoscope, and (3) the 'Multiplotter', a plotting machine for transferring type lines from photograph to map. There is a comment on the apparatus by *R. N. Colwell.*

2547. JOHNSON, E. W. **Using aircraft in checking forest photo-interpretation.** *J. For.* 50 (11), 1952 (853–5).

2548. ALDRICH, R. C. **Accuracy of land-use classification and area estimates using aerial photographs.** *J. For.* 51 (1), 1953 (12–5).

6. FOREST MANAGEMENT. BUSINESS ECONOMICS OF FORESTRY. ADMINISTRATION AND ORGANIZATION OF FOREST ENTERPRISES

61. FOREST MANAGEMENT: GENERAL, THEORY AND PRINCIPLES

See also Nos. 2090, 2535, 2542, 2550.

2549. **Corrigenda. A fallacy in the theory of growing stock by R. Bourne.** *Forestry* 26 (1), 1953 (53–4).

Corrections to certain obscurities and inaccuracies in the text and figures of the paper cited. [Cf. *For. Abstr.* 13 (No. 1452).]

62. WORKING PLANS. ANNUAL OR PERIODIC YIELD. YIELD REGULATION

See also No. 2090.

2550. KATAYAMA, S. **[Reflections on management plans for national [Japanese] forests.]** *For. [industr.] Econ., Tokyo* 5 (12), 1952 (26–9). [Jap.]

A brief discussion of developments, since national plans were introduced in Japan in 1896. A table is presented, from the *Fifty-year History of Imperial Forestry*, showing for the years 1908, 1918, 1928 and 1938 the area of State forest under the following rotations: 60–70, 80–90, 100–120, 140 and up. A rotation of 100–120 years was always the commonest.

2551. PENISTAN, M. J. **Uneven-aged woods and the plan of operations.** *Quart. J. For.* 47 (1), 1953 (19–27).

Methods of description, prescription, and recording silvicultural operations in uneven-aged woods are suggested, so that the information recorded will conform with that required for the forms of the Forestry Commission Plan of Operations. The need for flexibility in prescription is stressed, and periodic assessment, by mutual agreement between private woodland owner and private woodlands officer of the Forestry Commission, is suggested. A graphical method of recording the progress of felling and restocking is described, to be complementary to the map legend under the dedication scheme, and an example of a completed compartment form is given. *Author's summary.*

2552. MEYER, W. H. **Regulation of cut in immature, understocked forests.** *J. For.* 50 (12), 1952 (934–9).

2553. WADSWORTH, F. H. **Forest management in the Luquillo Mountains, III. Selection of products and silvicultural policies.** *Carib. For.* 13 (3), 1952 (93–142). 29 refs. [E.Span.]

[Cf. *For. Abstr.* 14 (No. 899).] Discusses some of the basic policies that should cover timber production and how they may be applied to the special problems of the Luquillo forests, viz. selection of products with regard to the market, silviculture (i.e., regeneration and felling methods) and choice of favoured species. The selection system is considered most suitable for this region, and some data are given showing the effects of fellings on basal area, volume and diameter growth in tabonuco- and colorado-type forests. A classification is presented of species growing in the Luquillo forests according to their value for (1) constructional uses, (2) furniture and (3) large poles; and information is given on their growth rates, size and properties. Some recommendations are made regarding exotic species suitable for underplanting.

65. SPECIAL BUSINESS PROBLEMS OF TIMBER-GROWING. CALCULATION OF COSTS AND PROFITABILITY. VALUATION

See also Nos. 2089–90, 2101, 2108, 2130, 2157, 2190, 2201, 2217, 2426, 2542, 2553, 2573, 2956.

2554. **Young-growth management in the Douglas-Fir region [: thinnings].** *Rep. Pacif. Nthwest. For. Range Exp. Sta. 1951,* 1952 (31–2).

Several methods were tested on a commercial basis on stands varying from 26 to 110 years and from II to IV site quality in different parts of the region. At Voight Creek, light thinning for 8-ft. sawlogs in a 45-year, site-III stand cost $30/1000 bd. ft., leaving $4–$8/1000 bd. ft. for stumpage. Logging was done by a 5- to 10-man crew, logs being skidded by horses to a maximum of 600 ft. Costs of horse skidding varied from $8/1000 bd. ft. for 100-ft. to $20 for 800-ft. distances. Only logs 8 in. or over in diameter repaid production costs. For well stocked stands of Douglas Fir on sites II and III in the Puget Sound area it was again shown that receipts from light thinnings will finance an adequate road system if the stand has reached at least 45 years. Growth measurements on plots thinned 3 years ago at Voight Creek show that as much as 41% of the cu.-ft. volume of well stocked Douglas Fir stands can be removed without appreciably reducing growth.

2555. POTIN, L. La loi naturelle du développement forestier et l'évaluation de la propriété forestière. **[The natural law of forest development and the valuation of forest property.]** Gauthier-Villars, Paris. 1951. pp. 143 + 3 dgms. 48 refs. [F.] Price [£1. 18*s.*]

In his first chapter, the author discusses formulae for the general expression of forest growth. The next 3 chapters develop formulae for the valuation

of the forest and the determination of the age of financial maturity for high forest and coppice separately; further chapters deal with probability and rates of interest. The second part of the volume deals with the practical application of the formulae developed in the first part and criticism of several current methods of valuation. An appendix explains the construction and use of three nomograms, (1) for valuing high forest, (2) for valuing coppice forest, and (3) for estimating the merchantable value of logs.

2556. ANDERSON, I. V. **Valuation of Ponderosa Pine stumpage by use of tree grades.** *J. For. Prod. Res. Soc.* 2 (1), 1952 (90–4). 3 refs. I.F.B.

Develops, with illustrations, 5 grades, in which tree age is the primary consideration and position in the stand only secondary, and exemplifies their application to estimates of value of standing crops. Keen's classes [cf. *For. Abstr.* 5 (p. 108)] are correlated in a table.

66. COSTING OF LOGGING OPERATIONS

2557. PUTKISTO, K. Metsäautotie vaiko moottoritalvitie? [**Forest truck road or winter road for motor vehicles**?] *Metsät. Aikak.* 1952 (12), (351–6). [Fi.e.]

Discusses the relative economy of forest truck roads, kept open throughout the year, and winter roads for seasonal traffic only. An analysis is made of the effects of length of depreciation period, rate of interest, and the production from forests within effective reach of the road, on the cost of interest plus depreciation and on profitability of road construction; figures are shown in graphs with English and Finnish legends. No general recommendations are made, but a close study of the economic aspects in each case is advised.

2558. RAWLS, I. W. **Large logs cost less to log than small logs.** *Sth. Lumberm.* 185 (2321), 1952 (125–6).

A graph is given showing the effect of size of average log upon time for logging 1,000 ft. bd. measure (figures for felling and cross-cutting, and for skidding, loading and hauling are shown in separate curves). Figures are based on logging records over 5 years, handling ca. 3,300,000 bd. ft. of Shortleaf and Loblolly Pine logs, at the Crossett Experimental Forest.

68. ADMINISTRATION AND ORGANIZATION OF FOREST ENTERPRISES

681. *National (Federal, State) Forest Services and Administration*

2559. KARSUDJONO. Planologi Kehutanan. [**Planning division of the Forest Service [of Indonesia**].] *Rimba Indonesia* 1 (4), 1952 (151–68 + 1 map). [Jav.e.]

An account of its organization and aims.

71. MARKETING OF FOREST PRODUCTS: GENERAL

See also No. 2577.

2560. **The timber trade: a *Financial Times* survey.** *Financial Times, London* 19 Jan., 1953. pp. 28.

Contains 20 papers by different authors on supply, markets and distribution; the use of timber in industry, mining, and for flooring; sawmilling; preservation; the plywood, fibre- and building-board, joinery and furniture industries; research and development; and the Timber Trade Federation and Forestry Commission.

2561. **Marketing and utilisation of timber grown in Scotland.** *Scot. For.* 7 (1), 1953 (27–9).

Includes 2 tables showing estimates for 1952–62 of total production from clear felling and thinnings by Conservancies in Scotland and of pitwood production and requirements.

2562. SÖDERLUND, E. F. [Editor]. **Swedish timber exports 1850-1950: a history of the Swedish timber trade.** Almqvist & Wiksells Boktryckeri Aktiebolag, Stockholm 1952. pp. 383. [E.]

2563. MOLDENHAWER, K. Om vedsituationen i bokskogsområdet. **[Timber in the Beech region.]** *Skogen* 39 (12*), 1952 (137*, 145*). [Sw.]

Discusses figures for increment, markets, utilization and prices of Beech in Skåne, Halland and Blekinge.

72. THE QUANTITATIVE ASPECTS OF MARKETING. DEMAND, CONSUMPTION AND SUPPLY

See also Nos. 2560–3, 2577.

2564. **T.D.A. statistical year book 1951.** Timber Development Association, London. 1st ed., 1952. pp. 24 + 2 tbls.

Contains tables showing U.K. imports, production, consumption and stocks of timber for different periods from 1920, and summaries of the value of all U.K. imports from 1949–51.

2565. **Board of Trade final report on the census of production for 1948, Vol. 10, Trade A, Timber.** H.M. Stationery Office, London. 1952. pp. 40. Price 3*s.* 6*d.*

A series of 26 statistical tables on production of sawmills and other timber goods (except furniture, wooden containers, and shop and office fittings) and cork products.

2566. ZUBOVIĆ, J. Produkcija ogrevnog drveta u Srbiji. **[Production of firewood in Serbia.]** *Glasn. šum. Fak., Beograd* No. 5, 1952 (13–23). 9 refs. [Serb.f.]

2567. STAMENKOVIĆ, B. O proizvodnji i potrošnji celuloznog drveta i njegovih proizvoda kod nas i u svetu. **[Production and consumption of pulpwood and its products in Jugoslavia and throughout the world.]** *Šum. List* 76 (4), 1952 (100–9). [Croat.g.]

According to figures for 1947–50 pulpwood represents 3·8% of the whole softwood output of Jugoslavia, the absolute figure being 354,000 cu. m. per year, of which 184,000 cu.m./year were exported. Pulpwood was only 1·2% of the whole hardwood output during the same period, or 205,000 cu.m./year. The production of chemical pulp in Jugoslavia averaged 22,900 tons/year.

2568. KIPLING, T. H. **The supply of wood fuel and roofing poles to Khartoum, the Gezira and Government departments.** *Bulletin, Ministry of Agriculture, Sudan* No. 5, 1950. pp. 22 + map. Price *Pias.*5 (1*s.* 0*d.*).

2569. **Timber production statistics [for Queensland, New South Wales, Tasmania, Victoria, and South Australia].** *Aust. Timb. J.* 18 (8), 1952 (567–70).

2570. Ulkomaankauppa. Vuosijulkaisu 71, 1951. **[Foreign commerce. Annual report 71, 1951.]** Suomen Virallinen Tilasto, Helsinki. 1953. pp. 44 + 217. [Fi.Sw.e.]

75. TRADE CUSTOMS AND USAGES

2571. MALLINSON, R. F. A. **Some recent changes in timber trade practice.** In *Timber Progress and Desk Book for 1953*, Cleaver-Hume Press, London. 1952. pp. 9–19.

Discusses the Nubaltwood charter for shipments from the Baltic and Norway to the U.K. and Eire, and the uniform 1951 contract form used for f.o.b. purchases from Finland, Sweden and Norway.

2572. YODER, R. A. **Drafting timber sale contracts from a forester's standpoint.** *J. For.* 51 (2), 1953 (98–100).

2573. COOKE, P. T. **Sale of coastal hardwood logs of N.S.W. on differential stumpages.** *Aust. Timb. J.* 18 (8), 1952 (616 . . . 631).

Proposals cover: (1) sale of timber in 3 girth classes for the N. and 3 for the S. coast; (2) rates within each girth class to vary according to the average % defect present in parcels of logs within the class; (3) sale of log timber at rates per 100 super ft. gross instead of nett Hoppus log measure; (4) the adoption of price margins between girth classes for logs of the same average defect %; and (5) retention of adjusted margins for Tallowwood and Ironbark and the inclusion of all other coastal species under hardwood rates. An example of calculating stumpage rates and examples of the application of the proposals to representative coastal mills are given.

78. ECONOMICS OF TRANSPORT

See also No. 2571.

2574. DICKINSON, F. E. **Development of southern and western [United States] freight rates on lumber.** *Sth. Lumberm.* 185 (2321), 1952 (229 . . . 245). 58 refs.

2575. **Handling timber cargoes.** *Timb. Tr. J.* 204 (3990), 1953 (1487–1504, 1506).

Account of a conference held by the International Cargo Handling Co-ordinating Association in London in February 1953, including extracts from papers on installations for unloading direct from barge to lorry (*A. Gourvitch*); world timber trade problems (*A. C. Priddle*); standardizing storage sheds (*G. B. Crow*); handling timber cargoes in the

U.S.A. (*P. M. Combes*); the lay-out and equipment of an Amsterdam timber warehouse (*L. A. van Nifterik*); and the design of a Dutch timber carrier (*A. C. Hardy*).

79. ECONOMICS OF THE WOOD INDUSTRIES

2576. KNEŽEVIĆ, M. Optimalno mesto strugare u vezi sa uticajem mesta potrošnje, unovčenja otpadaka, investicija i drugih faktora. **[Optimum location for a sawmill as regards place of consumption, sale of waste, investments, and other factors.]** *Glasn. šum. Fak., Beograd* No. 5, 1952 (243–55). [Serb.serb.f.]

Cf. *For. Abstr.* 12 (No. 3162).

8. FOREST PRODUCTS AND THEIR UTILIZATION

See also No. 2560.

2577. BRUCE, W. E. [Editor]. **Timber progress and desk book for 1953.** Cleaver-Hume Press Ltd., London. 1952. pp. 175. Price 15*s*.

Contains 13 papers (referenced individually in this issue of *For. Abstr.*) by different authors on wood structure, conversion, utilization and the timber trade, plus a reference section consisting of a select, classified bibliography, import statistics, list of world information centres for timber, and of timber trade and kindred organizations, and indexed pages for memoranda.

2578. ***Timber Technology and Machine Woodworking.*** Timber News Ltd., 154 Fleet St., London, E.C.4. Monthly. Price 12*s*. p.a.

This is the new title, as from January 1953, of *Timber News*. The original volume numbers are continued, the new title beginning at Vol. 61. Abbreviation in *For. Abstr.: Timber Technol.*

2579. SCOTT, C. W. **The forest products of Yugoslavia.** *Unasylva* 6 (4), 1952 (166–9).

2580. DĄBROWSKI, A. Laboratorium Badawcze Fizycznych i Mechanicznych Własności Drewna. **[Physical and Mechanical Wood Properties Research Laboratory [of the Forest Research Institute, Warsaw].]** *Sylwan* 96 (3), 1952 (382–4). [Pol.]

A short account of its activities.

2581. BAKER, W. J. [Revised by R. H. PLOW.] **The Oregon Forest Products Laboratory.** *Inform. Circ. Ore. For. Prod. Lab.* No. 3 (rev.), 1952. pp. 22

2582. **Summary of proceedings, forest products pre-conference August 4–9, 1952, held at Forest Products Laboratory, Ottawa, Canada.** Forest Products Laboratory, Ottawa, Canada. [1952]. pp. 43 + 8. (6th British Commonwealth Forestry Conference, Canada, 1952.)

81. WOOD AND BARK: STRUCTURE AND PROPERTIES

810. *General Information on Woods*

See also Nos. 1954–6, 1971, 1987, 2553, 2711, 2931.

2583. WOODS, R. P. **World review of the newer timbers and their commercial uses.** In *Timber Progress and Desk Book for 1953*, Cleaver-Hume Press, London. 1952. pp. 31–46.

Lists some of the timbers recently imported from Africa, S. America, and S.E. Asia, and gives a table showing common and scientific names, weight/cu. ft., origin, and actual and possible uses of some 40 species.

2584. JANE, F. W. **The structure of new timbers.** In *Timber Progress and Desk Book for 1953*, Cleaver-Hume Press, London. 1952. pp. 20–30.

Discusses the properties of a number of timbers, both softwood and hardwood, that have become available in some quantity since the war, and gives photomicrographs of *Araucaria angustifolia*, *Anisoptera* sp., *Lophira alata* var. *procera*, *Phoebe porosa*, *Daniella fosteri*, *Koompassia malaccensis* and *Afromosia elata*.

2585. TAMWORTH, I. P. **Timber used in Hong Kong.** Ye Olde Printerie Ltd., Hong Kong. 1952. pp. 131.

Describes properties, uses, pests and preservation of the timbers commonly used in Hong Kong, with keys for their identification: *Pseudotsuga taxifolia*, *Cunninghamia sinensis*, *Pinus massoniana*, *Chamaecyparis formosensis*, and some 20 hardwoods.

2586. CARDOSO, J. G. ALFARO. Madeiras de Moçambique. **[Mozambique timbers.]** *Repr.* from *Boletim da Sociedade de Estudos da Colónia de Moçambique, Lourenço Marques* No. 67, 1950. pp. 20 + 2 plates. [Port.]

A list of the most important timber species, with notes on their properties and nomenclature, prefaced by a brief description of the Mozambique forests and their exploitation. [Cf. *For. Abstr.* 14 (No. 606).]

2587. BUBLITZ, W. Die wichtigsten Holzarten des Monsunwaldes Kolumbiens. **[The most important timber species of Colombia's monsoon forests.]** *Z. Weltforstwirt.* 15 (3; 5), 1952 (139–40; 211–2). [G.]

Describes a further 11 species. [Cf. *For. Abstr.* 13 (No. 3282).]

2588. GUINIER, P. Le mélèze. **[Larch.]** *Rev. Bois Appl.* 8 (1), 1953 (7–10). [F.]

General characteristics, habitat, varieties, silviculture, structure and properties of the wood, and uses.

2589. Le pin de Parana. **[*Araucaria angustifolia*.]** *Rev. Bois Appl.* 8 (1), 1953 (41–2). [F.]

Wood structure, physical and mechanical properties, seasoning, conversion, finishing, natural durability, and possible uses.

2590. SCHMIDT, E. Überseehölzer Nr. 31–4. **[Foreign woods Nos. 33–4.]** *Suppls.* to *Z. Weltforstwirt.* 15 (4; 5), 1952. Each pp. 4. [G.]

Canarium schweinfurthii; *Ceiba pentandra*.

2591. LAMB, G. N. **Foreign woods.** *Wood, Chicago* 57 (12), 1952 (16). P.R.

Kaneelhart (*Licaria cayennensis*), and Quaruba (two spp. of *Vochysia*).

2592. **Specimen woods Nos. 204–6.** *Suppls.* to *Wood* 17 (12), 1952 (473–4); 18 (1; 2), 1953 (19–20; 61–2).

Salmwood (*Cordia alliodora*); Spotted Gum (*Eucalyptus maculata*); African Mahogany (dry zone) (*Khaya senegalensis*).

2593. **Timber leaflet: Pterygota (*Pterygota kamerunensis* and *P. macrocarpa*); Yellow Sterculia (*S. oblonga*).** Forest Products Research Laboratory, Princes Risborough. 1952. Each pp.3. P.R.

2594. KEYLWERTH, R. Holzeigenschaftstafeln: Cedro macho. **[Tables of wood properties: *Carapa* spp.]** *Holz Roh- u. Werkstoff* 10 (10), 1952 (413–4). 5 refs. [G.] P.R.

2595. PADDON, T. W. **New Beeches from South America.** In *Timber Progress and Desk Book for 1953*, Cleaver-Hume Press, London. 1952. pp. 47–51.

Discusses the general timber properties of the genus *Nothofagus* and describes the structure of *N. antarctica*, *N. betuloides*, and *N. pumilio*.

811. *Structure, Identification*

See also No. 2595.

2596. VAROSSIEAU, W. W., and KUKACHKA, B. F. **Suggestions for a standardized method of identification with mechanically operated punched cards.** *News Bull. int. Ass. Wood Anatomists* Jan., 1951 (5–11). 6 refs.

Cf. *For. Abstr.* 10 (No. 1094).

2597. STEARNS, J. L., and HARTLEY, C. **Physico-chemical methods for wood diagnosis.** *J. For. Prod. Res. Soc.* 2 (4), 1952 (58–61). 23 refs. P.R.

Describes, with examples, various methods of identification of woods, based on their chemical and physico-chemical properties, such as: (1) colour reactions, e.g. with methanol/HCl, phloroglucinol/HCl; (2) fluorescence of extracts; (3) fluorescence microscopy; (4) Maule colour reaction for separating woods of the angiosperms from those of the gymnosperms; (5) the benzidine/$NaNO_2$ reagent for distinguishing between 'white' and 'red' Oaks (this method is described in detail); and (6) chemical differentiation of sapwood and heartwood for Pines, Oaks, and Douglas Fir.

2598. SCOTT, M. H. **Burglars and bordered pits.** *J. S. Afr. For. Ass.* No. 22, 1952 (2–6 + 5 photos).

A popular account of some cases in which the Forest Products Institute at Pretoria has assisted the police or others by identifying wood, sawdust etc.

2599. JOHNSTON, D. R. **Structure drawings to 'Specimen Woods'. Sheets 18–20.** *Wood* 17 (12), 1952 (475); 18 (1; 2), 1953 (21; 63).

(18) Partridge Wood (*Caesalpinia granadillo*), Pyinkado (*Xylia dolabriformis*), Muninga (*Pterocarpus angolensis*) and Tambootie (*Spirostachys africana*); (19) Chikrassy (*Chikrassia tabularis*), Lignum-vitae (*Guaiacum officinale*), Box (*Buxus sempervirens*), and Alder (*Alnus glutinosa*); (20) Sandawa (*Cordia fragrantissima*), Whitebeam (*Sorbus aria*), Santa Maria (*Calophyllum brasiliense*), and Red Peroba (*Aspidosperma polyneuron*).

2600. SCHWEGMANN, L. M. **A key based on macroscopic and microscopic detail of the more important softwoods grown in or imported into South Africa.** *J. S. Afr. For. Ass.* No. 22, 1952 (51–9 + 24 photos). 7 refs.

Illustrated with photomicrographs of 24 species.

2601. GREGUSS, P. Xylotomischer Bestimmungsschlüssel der Gattungen und Arten der Podocarpaceae. **[Anatomical key for the determination of the genera and species of the Podocarpaceae.]** *Acta biol., Budapest* 3 (1), 1952 (52–149 + 1 tbl.). [G.russ.] O.R.S.

Gives anatomical keys to the genera *Phyllocladus*, *Sciadopitys* (single species), *Microcachrys* (single species), *Dacrydium*, *Prumnopitys* (single species), *Podocarpus*, *Austrotaxus* (single species) and *Acmopyle* (single species) and to the species of *Dacrydium*, *Phyllocladus*, and *Podocarpus*. The work is illustrated by 156 photographs and 39 sets of anatomical drawings. [Cf. *For. Abstr.* 13 (No. 2400).]

2602. GINDEL, I. **Some anatomical features of the indigenous woody vegetation of Israel.** *Suppl.* to *Bulletin of the Research Council of Israel, Jerusalem* 2 (2), 1952. pp. 16 + 24 photos. 13 refs. X.

The wood anatomy of most indigenous species was investigated. A correlation has been established between classified anatomical features and foliar aspect. Evergreens are predominantly diffuse-porous. Deciduous species are mainly ring-porous. An intermediate type is found in both evergreen and deciduous species. Desert species of Chenopodiaceae and some other families have an anomalous wood structure, in that strands of phloem are embedded in the xylem. The paratracheal type of parenchyma is the most prevalent, especially in its vasicentric variant. The energetic resumption of cambium activity after the prolonged hot and dry season, accounts for the formation of larger pores in the early wood, even in evergreens. The pores are mainly solitary and in multiples, mostly of 2 or 2 and 3 combined. Pores of small size are most frequent. Fine rays are dominant, except in a few species, e.g. Oaks, Oriental Plane (*Platanus orientalis*) and climbers. The occurrence of crystals, often of large size, is frequent. Data on pores, rays and presence of crystals are tabulated for a large number of species. *From author's summary.*

2603. MELLO, E. CUNHA. Parque Nacional do Itatiáia. Estudo dendrológico de essências florestais do Parque Nacional de Itatiáia e os caracteres anatômicos de seus lenhos. **[Itatiáia National Park. A dendrological study of forest species of Itatiáia National Park [Brazil], and the anatomical characteristics of the woods.]** *Boletim, Serviço Florestal, Ministerio da Agricultura, Rio de Janeiro* No. 2, 1950. pp. 174. 46 refs. [Port.port.f.e.g.] X.

Anatomical studies of 30 hardwood species, with descriptions of the trees.

2604. COZZO, D. Investigaciones anatómicas en maderas de Sapotaceas argentinas. **[Anatomical**

studies of the wood of the Argentine Sapotaceae.] *Revista del Instituto Nacional de Investigación de las Ciencias Naturales, Ciencias Botánicas, Buenos Aires* 2 (4), 1951 (263–90 + 3 plates). 37 refs. [Span.e.g.f.] X.

Presents a study of the anatomy of four species of *Pouteria*, two of *Chrysophyllum* and one of *Bumelia*, with keys to the genera and species, and a discussion of the phylogeny of the family.

2605. SHIMAJI, K. **Anatomical studies on the wood of some *Fagus* species.** *Bull. Tokyo Univ. For.* No. 42, 1952 (181–95 + 8 photos). 7 refs. [E.e.jap.]

The structure of *F. crenata*, *F. japonica*, *F. grandifolia* and *F. sylvatica* is described, and compared in tabular form with descriptions by other authors of *F. hayatae* and *F. multinervis*. A key to these species (except *F. hayatae*) is given. The diameter ratio of the fibres (i.e. fibre diameter/cell cavity, measured on fibres macerated and fully swollen) was calculated for 50 fibres from each sample; samples for *F. japonica* and *F. crenata* were taken at different heights in the stem. The ratio was largest in *F. japonica* (2·82, 2·92), decreasing through *F. grandifolia* (2·50) and *F. sylvatica* (2·41) to *F. crenata* (2·31, 2·21). The difference between *F. japonica* and *F. crenata* is significant, and the difference in the relative cell-wall quantity that it represents may be regarded as a reason for difference in sp. gr. and technical properties of the two species.

811.1. Anatomical Elements and Tissues

See also Nos. 1957, 2037, 2611–2, 2617, 2644, 2660, 2850.

2606. RITTER, G. J. **Microscopic polarized light method for studying cellulose fibers.** *Repr.* from *Paper Industry, Mount Morris, Ill.* 33 (8), 1951 (926–31). 3 refs. P.R.

Describes a method based on the doubly refractive property of cellulose crystallites in the fibres and rays, modifying the two parts of a beam of polarized light during its passage through the crystallites and producing characteristic colour effects.

2607. TRAYNARD, P., and AYROUD, A. M. Étude de la répartition de la lignine dans la membrane par action du chlore sur le bois de peuplier. **[Distribution of lignin in the cell wall, studied by means of the action of chlorine on Poplar wood.]** *Rev. gén. Bot.* 59 (706), 1952 (561–79 + 2 plates). 34 refs. [F.] O.B.D.

The absorption of Cl by Poplar wood was studied by means of a process of chlorination in a liquid and anhydrous medium. It was found that the process of absorption was not continuous, but took place in 3 stages. Since lignin is the only substance capable of reacting with Cl, this indicated that the lignin is not homogeneously distributed in the fibres. The question was further investigated by means of photomicrographs of the wood in the different stages of absorption, taken in polarized light. In the first stages a complete disappearance of the compound middle lamella was noted. More prolonged treatment, giving more complete delignification, resulted in the appearance of 3 distinct layers of cellulose. The lignin, therefore, appears to be contained in the middle lamella and in layers within the secondary cell wall.

2608. GREENIDGE, K. N. H. **An approach to the study of vessel length in hardwood species.** *Amer. J. Bot.* 39 (8), 1952 (570–4). 22 refs. O.B.D.

A survey of total vessel length in 8 diffuse-porous and 3 ring-porous species has revealed marked differences in the length of the conducting elements in these two structural types. In the more highly specialized forms, a single vessel may extend from the secondary wood of the terminals of the upper crown to ground level and possibly into the root system. In diffuse-porous species, however, the water-conducting elements are of determinate length, and in healthy, vigorous, forest-grown material, total vessel length varies between fairly well defined limits. The results of several independent lines of investigation suggest that the vertical rates of water conduction in large woody stems may be closely correlated with total vessel length. In ring-porous woods, moisture moves upwards in channels unobstructed by cross-walls or septa. In less highly specialized forms, however, intervessel transfer is a necessary consequence of the determinate nature of the conducting elements, and the vertical rates of moisture movement are correspondingly reduced. However, a consideration of the length of water-conducting elements in gymnospermous woods, together with the results of a preliminary reconnaissance of the water relationship of a number of native hardwood species, suggest that due regard should be given to the patterns of moisture retention in addition to moisture movement in any study of the water economy of a species. *Author's summary.*

2609. VASILJEVIĆ, S. O dužini mehaničkih elemenata u granicama prstena prirasta. **[Length of mechanical elements within the growth ring.]** *Glasn. šum. Fak., Beograd* No. 5, 1952 (257–64). 5 refs. [Serb.serb.e.]

Presents results of an investigation on the variation of the cell (fibre) length within a growth ring for *Cornus mas*, *Tilia tomentosa*, *Corylus avellana*, *Prunus domestica*, *Ailanthus altissima*, and *Morus alba*. Average data for 3 successive growth rings and 5 segments within each are given, and the data for the most characteristic growth ring are plotted. Numbering the segments from within outwards, cells in 1 are shorter than in 5 for *Cornus*, *Ailanthus*, and *Morus*, longer than in 5 for *Tilia* and *Prunus*, and equal to those in 5 for *Corylus*. The maximum cell length occurs in 2–3 for *Tilia*, 2–4 for *Prunus* and *Ailanthus*, 3 for *Morus*, and 3–4 for *Cornus* and *Corylus*.

2610. VASILJEVIĆ, S. Odnos broja traka lignuma prema širini i starosti prstenova prirasta kod *Acer pseudoplatanus* L. **[Relationship between the number of xylem rays and the width and age of growth rings in *A. pseudoplatanus*.]** *Glasn. šum. Fak., Beograd* No. 3, 1951 (41–7). [Serb.serb.e.]

Measurements on 5 stems gave the following results: (1) the number of rays per sq. mm. is greater in narrow-ringed than in wide-ringed stems; (2) in stems with a mean ring width of 1·7 mm. or more the number of rays decreases regularly outwards

(observed for 70 rings), but in stems with narrower rings this decrease changes after 50–60 rings to a slow increase.

811.2. Special Features and Abnormal Structure

See also Nos. 2262, 2849–51, 2917.

2611. Harada, H., and Miyazaki, Y. [**Electron-microscope study of compression wood.**] *Bull. For. Exp. Sta. Meguro, Tokyo* No. 54, 1952 (101–14). 14 refs. [Jap.e.]

Examination of the early-wood cell wall of compression-wood tracheids of *Chamaecyparis obtusa* and *Pinus densiflora* by electron microscope showed: (1) meshlike structure of fibrils in the primary wall; (2) that in the outer layer of the secondary wall, fibrils are inclined at about 80° and in the inner layer at 35° to the longitudinal axis of the tracheid, and that in the inner layer of the secondary wall they lie in the same direction as the marked longitudinally spiral striations characteristic of compression wood; (3) that the inner surface of the tracheid wall shows the partial structure; (4) that at the pit border, fibrils show a circular orientation and are deflected round the pit; and (5) that at the pit membrane, fibrils radiate from the torus. These observations confirm earlier optical observations by other writers. The article is illustrated by electron micrographs. [Cf. *For. Abstr.* 12 (No. 2987).]

2612. Wardrop, A. B., and Dadswell, H. E. **The nature of reaction wood. III. Cell division and cell wall formation in conifer stems.** *Aust. J. sci. Res.* 5*B* (4), 1952 (385–98 + 4 photos). 37 refs. P.R.

Cell division, the nature of extra-cambial readjustment, and the development of the secondary wall in the tracheids of conifer stems have been investigated in both compression wood and normal wood. It has been shown that the reduction in tracheid length, accompanying the development of compression wood and, in normal wood, increased radial growth after suppression, result from an increase in the number of anticlinal divisions in the cambium. From observations of bifurcated and otherwise distorted cell tips in mature tracheids, of small but distinct terminal canals connecting the lumen to the primary wall in the tips of mature tracheids, and of the presence of only primary wall at the tips of partly differentiated tracheids, and from the failure to observe remnants of the parent primary walls at the ends of differentiating tracheids it has been concluded that extra-cambial readjustment of developing cells proceeds by tip or intrusive growth. It has been further concluded that the development of the secondary wall is progressive towards the cell tips, on the bases of direct observation of secondary wall formation in developing tracheids and of the increase found in the number of turns of the micellar helix per cell with increasing cell length. The significance of this in relation to the sub-microscopic organization of the cell wall has been discussed. Results of X-ray examinations and of measurements of tracheid length in successive narrow tangential zones from the cambium into the xylem have indicated that secondary wall formation begins before the dimensional changes of differentiation are complete. [Cf. *For. Abstr.* 12 (No. 3066).] *Authors' summary.*

2613. Jayme, G., and Harders-Steinhäuser, M. Über die chemische Zusammensetzung des Zugholzes in einem Pappelholz. [**Chemical composition of tension wood in a Poplar.**] *Papier, Darmstadt* 4 (7/8), 1950 (104–13). 23 refs. [G.g.] L.S.

Chemical analysis of tension wood from an excentrically grown 8-year-old lateral branch of *P. canadensis* showed a lower content of lignin, pentosan and easily soluble hemicelluloses, a slightly higher content of the strongly adhering pentosan, and, in especial, a much higher content of pure cellulose than normal wood. The excess of the pure cellulose content of the tension wood over that of the branch as a whole was 8·27% and over normal wood, 20·23%. [Cf. *For. Abstr.* 14 (No. 2851).]

811.5. Sapwood and Heartwood

See Nos. 2617–8, 2622, 2624.

812. *Physical and Mechanical Properties*

See also Nos. 2508, 2657–60, 2906.

2614. Kloot, N. H. **Mechanical and physical properties of Coconut Palm.** *Aust. J. appl. Sci.* 3 (4), 1952 (293–323). 17 refs. P.R.

Values for moduli of rupture and elasticity have been determined for four-point bending tests on 10 logs. Because of the high variability of results obtained, it is considered that design stresses should be derived to suit the particular conditions for each use made of the logs. Standard mechanical tests were also carried out on small specimens cut from the ends of the logs. Although the trees of this species, a monocotyledon, yield a proportion of fair-quality timber, this material is more or less confined to a zone within 2 in. of the bark. Large variations in properties across the logs and a decrease in strength with height in tree have been noted. Some correlations between properties have been examined and correlation coefficients much higher than those usually obtained with other timbers have been recorded. The relationships between moisture content, strength, and density of wood in the green state have been examined, the wide variation in the properties of this palm providing an opportunity for such a study seldom available in other species. Investigations to determine whether the strength properties increase as the timber is dried indicated that the exponential strength/moisture relation already observed with other timbers also applies to this species. A brief examination has also been made of compressive strength and density as related to the number of steles which are a characteristic of the wood structure. *From author's summary.*

2615. Solari, F. S. Estudio sistemático de las maderas producidas en la provincia de Buenos Aires. [**Study of timbers produced in Buenos Aires province.**] *Publicaciones del Laboratorio de Ensayos de Materiales e Investigaciones Tecnológicas, Eva Perón* (*Ser. 2*) No. 42, 1952. pp. 25. [Span.]

The physical and mechanical properties of *Pinus radiata*, *Gleditsia triacanthos*, *Fraxinus chinensis*, *Acer negundo* and *Ailanthus altissima*.

2616. Paul, B. H., and Drow, J. T. **Some physical and mechanical properties of American Beech.** *Beech Utiliz. Ser. Ntheast. For. Exp. Sta.* No. 1, 1951. pp. 17.

Gives data on: density, shrinkage, occurrence of spiral grain, bending and compressive strength, stiffness, hardness, shock resistance, nail-holding power and fissibility.

2617. Vakin, A. T., Černcov, I. A., and Akindinov, M, V. Tehničeskie svoïstva drevesiny zapadnoukrainskogo buka. **[Technical properties of the wood of Western-Ukrainian Beech.]** *Lesn. Prom.* 12 (3), 1952 (27–30). 2 refs. [Russ.]

Tabulates the results of an investigation on the physical, mechanical and some other properties of the sapwood (s.w.) and heartwood (h.w.) of *Fagus sylvatica* from the Transcarpathian district of Western Ukraine. The h.w. includes both false heart and frost heart. Anatomical study revealed the lowest % of tylosed vessels in the outer zone of a two-zoned h.w. (i.e. in the frost heart). In just over 50% of cases, fungi were isolated from the heartwood (mostly *Torula* sp. and Sphaeropsidales; but wood-destroying fungi in only 6·5%). Densities were: (1) in logs with a star-shaped h.w.: (*a*) s.w. $0{\cdot}665 \pm 0{\cdot}006$, h.w. $0{\cdot}687 \pm 0{\cdot}006$; (2) in logs with two-zoned circular h.w.: (*a*) s.w. $0{\cdot}654 \pm 0{\cdot}004$; (*b*) frost-heart zone, $0{\cdot}665 \pm 0{\cdot}004$; (*c*) inner h.w. zone $0{\cdot}687 \pm 0{\cdot}008$. The moisture content of winter-felled logs was: s.w. 84·3%; frost heart 69·7%, and inner zone 52·8%. Absorption of water was initially greater in both zones of the two-zoned h.w., and less in the star-shaped h.w., than in s.w.; when the soaking was continued for a longer period, the absorptive capacity of all 3 portions converged towards 80–90% of that of s.w. Most of the strength coefficients are greater for h.w. than for s.w., but in some cases the difference is almost negligible.

812.1. Optical, Acoustic, Frictional, Thermal and Electrical Properties

See also Nos. 2162, 2631, 2810, 2841.

2618. Nambiyar, V. P. N. **Application of Russel effect to the identification of the heartwood and sapwood of Sal.** *Curr. Sci.* 21 (10), 1952 (289–90). 3 refs. A.P.B.

Heartwood and sapwood of *Shorea robusta* may be distinguished by obtaining Russel images, in which the more dense heartwood is clearly shown up. [Cf. *For. Abstr.* 13 (No. 3309).]

2619. Maku, T. **[Heat conduction in wood. IV Heat conduction parallel to the grain.]** *Wood Res. Kyoto* No. 8, 1952 (55–67). 9 refs. [Jap.e.]

Values for thermal diffusivity parallel to the grain (a_{11}) were obtained by heating several species of varying moisture contents (m.c.) by steam and by hot-press methods, and were compared with those calculated from equations from Part III [see *For. Abstr.* 13 (No. 4177)]. (1) The effect of temperature on a_{11} was negligible, as was that of sp. gr. when heating was by the hot-press method, but considerable differences were found between hardwoods and softwoods heated by steaming. The measured value was always considerably higher than the calculated value. (2) The value of a_{11} decreased with increasing m.c. but became constant at about 100% in softwoods and 80% in hardwoods. Differences between the measured values of softwoods and hardwoods and the calculated values were high for low m.c. but slight at m.c. above 100%. (3) At initial m.c. of below 30% in softwoods and 10% in hardwoods the value of a_{11} varies considerably; in the initial heating period, therefore, the error of temperature in the fibre direction calculated from the average value of a_{11} will not be negligible. (4) Some equations quoted in part I [see *For. Abstr.* 12 (No. 366)] have been amended. *From author's summary.*

812.2. Behaviour with Liquids and Gases. Moisture Relations etc.

See also Nos. 2607, 2660, 2707, 2765, 2768–9, 2833–4, 2835–6, 2841, 2906.

2620. Ripley-Duggan, B. A. **Adsorption o wood from aqueous solutions: I—Adsorption of ba-f ium chloride, sodium chloride, and of water.** *N.Z. J. Sci. Technol.* 34*B* (1), 1952 (1–9). 8 refs. P.R.

Adsorption from aqueous solutions by wood is a heterogeneous process, consisting of a rapid adsorption of water accompanied by a slower adsorption of solute. Equilibrium is reached within a few hours. When account is taken of the adsorption of water, the degree of adsorption of Ba ions from $BaCl_2$ is found to be a linear function of concentration. The adsorption of water was taken from the work of Barkas. $BaCl_2$ is hydrolytically adsorbed at low concentration, but with increasing concentration the degree of non-hydrolytic adsorption increases, reaching 100% from saturated solutions. Projection of Barkas' isotherm for water adsorbed from the liquid phase shows that the isotherm apparently converges towards the vapour-phase adsorption isotherm. *Author's summary.*

2621. Hanmamedov, K. M. Opredelenie vlažnosti propitannoï drevesiny. **[Moisture determination in impregnated wood.]** *Lesn. Prom.* 12 (3), 1952 (31–2). [Russ.]

The oven-drying and distillation method of determining the moisture content of wood impregnated with oily preservatives can be used provided the % of the preservative absorbed is known. For this, it is necessary to determine the average absorption of the given preservative by the given (oven-dry) wood at a given temperature, and for different impregnation periods. The oil content is read off the graph obtained, if the time of impregnation is known.

2622. Janiczek, M., and Bobrowicz, E. Wilgotność drewna świeżego buków pomorskich i Karpackich. **[[Distribution of] moisture content in the green wood of *Fagus sylvatica* growing in Pomorze and the Carpathians.]** *Prace Inst. Bad. Leśn.* No. 78, 1952. pp. 44 + 4. 24 refs. [Pol.russ.]

It has been found that the distribution of moisture content (m.c.) across the stem of *F. sylvatica* at two levels: (1) butt, and (2) at the crown base, is the same for trees from Northern Poland (Pomorze) (*n*), and Southern Poland (Carpathians) (*s*), the only serious differences being found in the false heart of Carpathian Beeches. Measurements were made on 57 trees from 5 sites felled from July, 1949, till August, 1950. The average d.b.h. was ca. 43 cm., height 26·5 m., age 111 years, height of crown base 11·25 m., sectional area at butt 2050 sq. cm., at crown base 970 sq. cm., the regional differences being small; false heart accounted for 0·5% (butt section) and 3·1% (crown-base section) of the sectional area in (*n*), 8·6 and 26·2% in (*s*). Sapwood m.c. is ca. 63% for (*n*) and (*s*) and for both levels, the variation between trees being several % during the growth period, rising up to 20% at the end of the rest period. The maximum and minimum m.c. occur at the end of the rest and growth periods, respectively, the amplitude exceeding 20%. In the sapwood the peripheral zone is usually that with the highest, and the innermost zone that with the lowest m.c. Irrespective of the time of the year, false heart is the moistest zone at butt section, and the driest at the crown base, while sapwood shows a reverse relationship.

2623. Watanabe, H., Aso, K., and Tutsumoto, T. **[Studies on the process of compression shrinkage of wood.]** *Trans. 59th Mtg. Jap. For. Soc.* 1951 (211–2). 3 refs. [Jap.e.]

Six different woods [not specified] were subjected to ca. 10 swelling/shrinkage cycles, i.e. a block of oven-dried wood was clamped so as to prevent radial (or tangential) dimensional change, soaked to saturation in water, then unclamped and dried. It was found that (1) when radial swelling was inhibited, the amount of radial shrinkage generally increased with the density of the wood; (2) no parallel relationship existed for tangential swelling; (3) the shrinkage of clamped wood is usually less than that of non-clamped wood; (4) the radial shrinkage of the radially clamped wood is less than the tangential shrinkage of the tangentially clamped wood; and (5) after several cycles, the successive amount of shrinkage decreases gradually, the decrease being greater in dense woods of homogeneous structure.

2624. Yakeyama, Y. **[On the porosity of wood with special reference to Sugi (*Cryptomeria japonica*).]** *Trans. 59th Mtg. Jap. For. Soc.* 1951 (213–5). 4 refs. [Jap.e.]

Tests with a volumenometer have shown that the heartwood of *C. japonica* is less porous than the sapwood. For thicknesses above 6 mm. the specific permeability does not depend upon the thickness of the sample, while increasing rapidly for thinner pieces. The rate of moisture adsorption per unit mass of the wood is greater for sap than for heartwood. *From author's summary.*

2625. Inose, O. **[Treatment of wood with common-salt solution (capillary rise of salt solution).]** *Trans. 59th Mtg. Jap. For. Soc.* 1951 (224–6). 2 refs. [Jap.e.]

Presents results of tests on the change in the NaCl concentration and water content of oven-dried wood test-pieces, the bottom surface of which was in contact with an aqueous solution of NaCl. Owing to the selective absorption of water by the cell walls, the NaCl concentration in the coarse capillary ducts was greater than that of the original solution. The capillary rise becomes greater with time, up to a certain limit, after which only diffusion of water occurs.

2626. Konishi, Y., and Yamamoto, T. **[Calculations of capillary diameters in wood from liquid absorption data.]** *Wood Res., Kyoto* No. 8, 1952 (68–73). [Jap.e.]

Mean diameters were calculated from figures showing the relationship of quantity of water absorbed to $\sqrt{\text{time}}$ of absorption as follows: *Chamaecyparis obtusa* 0·93μ for air-dried woods and 9·46 for woods saturated with water vapour; *Thujopsis dolabrata* 0·59μ for air-dried woods; *Cryptomeria japonica* 0·57 and 11·00; and *Fagus crenata* 1·58 and 18·30.

812.3. Density. Specific Gravity. Buoyancy

See Nos. 2162, 2331–2, 2659–60, 2906.

812.7. Strength Properties

See also Nos. 2656, 2696, 2731–2, 2739, 2798, 2811–2, 2834, 2869.

2627. Samorzewski, J., and Żbikowski, T. Tabele pomocnicze do obliczeń związanych z badaniami mechanicznych i strukturalnych własności drewna. **[Auxiliary tables for evaluations involved in the investigation of the mechanical and structural properties of wood.]** *Prace Inst. Bad. Leśn.* No. 84, 1952. pp. 24. [Pol.]

Includes tables adapted for different strength measurements, where the cross-section dimensions of the test-piece vary from 1·90 to 2·10 cm.; also tables for quick evaluation of impact strength and a table for ring-counts showing the number of annual rings per cm.

2628. Dohr, A. W. **Mechanical properties of Brazilian Parana Pine.** *Sth. Lumberm.* 186 (2324), 1953 (39 . . . 42). 4 refs.

Discusses the working, seasoning and strength properties of *Araucaria angustifolia* from Brazil, and gives graphs showing its mechanical properties compared with 6 other softwood species, and the influence of compression wood on the relationship of modulus of rupture and modulus of elasticity to density in static bending tests and of maximum crushing strength and modulus of elasticity to density in compression tests. [Cf. *For. Abstr.* 14 (No. 805).]

2629. Siemiński, R. Drewno żywiczne sosny pospolitej. **[Resinous wood of *Pinus sylvestris*.]** *Sylwan* 96 (3), 1952 (332–5). [Pol.russ.]

Presents the results, corrected for 15% moisture content, of mechanical tests (compression, static and dynamic bending, impact, shear, hardness) on samples from butt ends of 5 Pine stems from different parts of Poland, the resin contents of which varied between 1·45 and 21·96%. The differences between wood rich in resin and that of normal resin

content are not marked, although in most cases the former shows slightly higher values of mechanical strength.

2630. KITAZAWA, G. **Young's modulus of elasticity of small wood beams by dynamic measurements.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (228–31). 10 refs. P.R.

[Cf. *For. Abstr.* 13 (No. 633).] Data are given on the influence of moisture content and grain angle on the dynamic modulus.

2631. GUPTA, S. C. D. **Transverse vibration of a wooden plate.** *Bulletin of the Calcutta Mathematical Society* 43 (4), 1951 (143–6). 2 refs. L.S.

A mathematical analysis of the problem of plain stress assumed to exist for the case of a flat-sawn wooden board.

2632. NAKAMURA, T. **[The rectangular-nail-holding power of wood.]** *J. Jap. For. Soc.* 34 (1), 1952 (12–5). [Jap.e.]

Tests were made on 32 types of nail, all rectangular in cross-section, from 6 to 20 mm. thick, in sleepers of Hiba (*Thujopsis dolabrata*) and Nara (*Quercus crispula*). The relative difficulty in driving (measured by the depth after the first driving blow, mean depth after the second blow, and number of blows needed to drive the nail up to the head), the pulling force and the lateral resistance, are proportional (the depth inversely so) to the cross-sectional area of the nails. Mean unit pressure perpendicular to the grain is larger than that parallel to the grain and the former is about $\frac{2}{3}$ of the mean unit holding power.

812.8. Workability. Working Properties

2633. ANTOINE, R. Comment scier les bois du Congo? **[How to saw Congo timbers.]** *Bull. Inform. Inst. nat. Étude agric. Congo belge* 1 (4), 1952 (279–86). [F.]

Gives working qualities, suitable type of sawtooth, angle of sawblade and speed of working for *Alstonia boonei*, *Ongokea gore*, *Combretodendron africanum*, *Erythrophleum guineense*, *Celtis* sp., *Allanblackia floribunda*, *Polyalthia suaveolens*, *Phialodiscus plurijugatus*, *Piptadenia leucocarpa*, *Fillaeopsis discophora*, *Canarium schweinfurthii*, *Ceiba pentandra* and *Ricinodendron africanum*.

813. *Wood Chemistry*

See also Nos. 2597, 2859.

2634. KURTH, E. E., FOSTER, D. H., and INGLES, D. L. **The analysis of some Tasmanian timbers.** *Aust. J. appl. Sci.* 3 (4), 1952 (384–94). 28 refs. P.R.

Presents results of an investigation on the chemical composition of 13 single samples of Tasmanian species, among them, for the first time, of: *Atherosperma moschatum*, *Acacia dealbata*, *A. melanoxylon*, *Casuarina* (*quadrivalvis*?), *Phyllocladus rhomboidalis*, *Athrotaxis selaginoides*, and *Dacrydium franklinii*. In addition, determinations of the total sugar obtainable by hydrolysis with 72% H_2SO_4 have been compared with results obtained on hydrolysis of the samples with 2% H_2SO_4 at 173° C. in a small percolation apparatus. *From authors' summary.*

2635. WISE, L. E., RITTENHOUSE, R. C., DICKEY, E. E., OLSON, O. H., and GARCIA, C. **The chemical composition of tropical woods.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (237–49). 21 refs. P.R.

By procedures similar to those described previously [*For. Abstr.* 13 (No. 4203)], the following woods were subjected to qualitative and quantitative analysis: *Couratari pulchra*, *Eschweilera sagotiana*, *Dicorynia paraensis*, *Tectona grandis*, *Swietenia macrophylla*, and *Ocotea rodiaei*. The ash of these woods, and of the following were examined spectographically: *Tabebuia guayacan*, *Pseudosamanea guachapele*, *Ocotea rubra*, *Manilkara bidentata* (specimens from Puerto Rico and from Surinam), *Cordia alliodora*, *Hymenaea courbaril*, *Licaria cayennensis*, *Syncarpia laurifolia* (from Australia and from Hawaii), and *Antidesma pulvinatum*. The wax of *O. rubra* was also studied. The resistance of these woods to insect penetration was compared with that of U.S. hardwoods. Ten (out of 15) tropical woods and 4 (out of 11) U.S. woods showed marked resistance to penetration by the cadelle (*Tenebroides mauritanicus*). In certain instances, the removal of extractives increased penetrability. Five of the tropical woods were resistant to *Rhizopertha dominica* (in the presence of *T. mauritanicus*) but, when the food supply of these lesser grain borers became scanty, they had entered the wood in all cases by the end of 4 months. *From authors' summary.*

2636. ISTAS, J.-R., and RAEKELBOOM, E. L. Contribution à l'étude chimique des bois du Mayumbe. **[A contribution to the chemical study of the timbers of Mayumbe.]** *Publ. Inst. nat. Étude agron. Congo belge (Sér. sci.)* No. 53, 1952. pp. 122 + 3 tbls. + 67 photos. 23 refs. [F.] Price *Fr.*100.

Includes results of chemical analyses of 67 timber species from the Belgian Congo. The following general conclusions are drawn from the data: (1) The wood of *Staudtia gabonensis*, *Bosqueia angolensis*, *Gossweilerodendron balsamiferum* and some others has a remarkably high proportion of organic-solvent extractives. (2) *Staudtia gabonensis* and *Antrocaryon micraster* have a high content (12·86% and 16·11% respectively) of water-soluble extractives. (3) The cellulose composition of the Congo timbers is not strikingly different from that of temperate hardwoods, but their content of pentosans is generally inferior. (4) From the point of view of hydrolysis, the most promising species would be *Albizzia coriaria*, *Alstonia congensis*, *Hannoa klaineana*, *Canarium schweinfurthii*, and *Bombax flammeum*

813.1. Chief Organic Constituents. Constituents of the Cell Wall

See also Nos. 2607, 2613.

2637. FREUDENBERG, K. Verfahren zur Gewinnung von löslichem, unverändertem Lignin. **[Method of obtaining soluble unaltered lignin.]** *German Patent* No. 836,351, April 10, 1952. pp. 4. P.O.

Lignin is obtained by extraction with acidified organic solvents such as tetrahydrofurane, dioxane, or tetrahydropyrane.

2638. MIGITA, N., NAGANO, T., and NAKANO, J. **[The mechanism of the colour reaction of lignin. (I) The relation between the colour reaction of chlorinated**

lignin and the Mäule reaction; (II) The mechanism of the Mäule colour reaction.] *Bull. Tokyo Univ. For.* No. 43, 1952 (139–49). 17 refs. [Jap.e.]

2639. APENITIS, A., ERDTMAN, H., and LEOPOLD, B. **Studies on lignin. Part V. The decay of Spruce wood by brown-rotting fungi.** *Svensk Kemisk Tidskrift, Stockholm* 63 (9), 1951 (195–207). 19 refs. [E.e.] L.S.

The decay of wood by *Coniophora puteana*, *Lentinus lepideus*, *Lenzites sepiaria* and *Merulius lacrymans* was studied. The methoxyl, lignin, cellulose and pentosan contents and materials soluble in benzene/ethanol, hot water and alkali for different stages of decay are shown in graphs and tables. Cellulose was almost completely and uniformly destroyed, while pentosans appeared to contain some fractions relatively resistant to fungal attack. Lignin, although its relative content increased during decay, was attacked and decomposed by the fungi, the residual lignin being changed in some respects. *Coniophora* caused the least and *Lentinus* and *Lenzites* the most loss and change.

2640. LEOPOLD, B. **Studies on lignin. Part VIII. Nitrobenzene oxidation and sulphonation of wood decayed by brown-rotting fungi.** *Svensk Kemisk Tidskrift, Stockholm* 63, 1951 (260–71). 14 refs. [E.e.] L.S.

2641. LEOPOLD, B. **Studies on lignin. Part IX. The production of vanillin by oxidation of lignin with nitrobenzene and alkali.** *Svensk Kemisk Tidskrift, Stockholm* 64 (1), 1952 (1–18). 17 refs. [E.e.] L.S.

In laboratory experiments unsuccessful attempts were made to obtain a suitable raw material by removal of the carbohydrates from Spruce wood by careful partial acid hydrolysis. In subsequent microbiological experiments, wood was exposed to decay by 4 brown-rot fungi and results showing the rate of decay for different variables are tabulated. Finely divided wood decayed more rapidly, access of air and an adequate nutrient supply were important (but availability of large excess amounts did not increase rate of decay), and low temperature and humidity decreased the rate of decay. In a series of oxidation experiments, the effect on yields of vanillin of such variables as reaction temperature, time, alkali concentration, particle size of the wood and amounts of nitrobenzene or of NaOH added, are given in graphs. The effects of 8 different oxidizing agents on yields of vanillin were also studied. Yield was found to be increased by extraction before oxidation with water, ethanol/benzene or alkali; only extraction with water was economically advantageous, the other treatments being expensive or increasing the consumption of alkali. In these laboratory tests, the decrease in the chemicals needed to obtain a given yield of vanillin from decayed wood, and the fairly high yields of alkali obtained were considered promising, and pilot-plant experiments were carried out in co-operation with a commercial firm. Up to 75 kg. of Spruce wood flour were exposed to decay by *Lenzites sepiaria* for $6\frac{1}{2}$ months. Oxidations were made in a continuous-flow apparatus and yields obtained equalled those obtained in the laboratory. A good-quality product was obtained fairly readily by extraction with trichloroethylene. Comparison of costs shows that the new method may well compete with the clove-oil method for economy and quality of product. [Cf. *For. Abstr.* 14 (No. 1524).]

2642. LEOPOLD, B. [**Studies on lignin. Part XI.**] **Studies on the alkaline nitrobenzene oxidation of lignin and lignin models: an attempt to develop an economical method for the production of vanillin based on lignin raw material.** *Svensk Kemisk Tidskrift, Stockholm* 64 (1), 1952 (18–26). 36 refs. [E.] L.S.

A review of the work so far done.

2643. LEOPOLD, B. **Studies on lignin. XVI. Nitrobenzene oxidation of methylated lignins.** *Svensk PappTidn.* 55 (21), 1952 (816–9). 12 refs. [E.e.] P.R.

Cf. *For. Abstr.* 13 (Nos. 4207–8).

2644. ASUNMAA, S., and LANGE, P. W. **Microspectrographic determination of the distribution of periodic acid oxidised regions in the cell wall of holocellulose from Spruce.** *Svensk PappTidn.* 55 (24), 1952 (936–41). 23 refs. [E.sw.g.] P.R.

Cf. *For. Abstr.* 12 (No. 3017).

2645. HEUSER, E. **The present status of the chemistry of cellulose.** *Tappi* 35 (11), 1952 (481–9). 165 refs. P.R.

Reviews literature for the last decade.

813.2. Minor Organic Constituents. Extractives. Cell Contents

See also Nos. 1933, 2882.

2646. ENKVIST, T., and LINDBERG, J. Laboratorieapparatur för extraktion av vedspån med flyktiga lösningsmedel. [**Laboratory apparatus for extracting wood chips with volatile solvents.**] *Pap. ja Puu* 34 (12), 1952 (464–6). 2 refs. [Sw.e.] [Helsingfors Universitet.] P.R.

An inexpensive apparatus, which has been in use for several months is described and illustrated. Acetone is evaporated at a rate of about 5 litres/hr. and 1 kg. chips can be thoroughly extracted in about 15 hr. Graphs are given showing the rate of extraction of Spruce with acetone.

2647. GRIPENBERG, J. **The chemistry of the natural order Cupressales. IX. The synthesis of hexahydrothujic acid.** *Acta chem. scand.* 6 (6), 1952 (854–8). 7 refs. [E.e.] O.R.S.

Cf. *For. Abstr.* 14 (No. 1533).

2648. NAKATSUKA, T. [**The occurrence of α- and β-thujaplicin in the essential oil from the wood of *Thuja occidentalis* L.**] *J. Jap. For. Soc.* 34 (8), 1952 (248–50). 5 refs. [E.jap.]

α- and β-thujaplicin but no γ-thujaplicin were isolated from the essential oil of *T. occidentalis* planted in Hokkaido. In previous experiments in Scandinavia α- and γ- and no β-thujaplicin were found. [Cf. *For. Abstr.* 11 (No. 2789).]

2649. BRANDT, C. W. **Note on the influence of phenolic diterpenoids from some New Zealand conifers on the drying-out of linseed oil.** *N.Z. J. Sci. Technol.* 34*B* (1), 1952 (65–6). 6 refs. P.R.

Tests show that failure of oil paints to dry at a satisfactory rate on Totara [*Podocarpus totara*] and greasy-heart Rimu [*Dacrydium cupressinum*] is due to the presence of phenolic diterpenoids in these woods.

2650. Ito, H. **[Eriodictyol obtained from the wood of *Prunus serrulata* var. *spontanea* S. et Z.]** *J. Jap. For. Soc.* 34 (2), 1952 (42–3). [Jap.e.]

A flavanone derivative, m.p. 265–6° C., obtained by Pb precipitation, was identified as eriodictyol (4′, 5, 5′, 7-tetrahydroxy-flavanone).

813. Ash Constituents

2651. Amos, G. L. **Silica in timbers.** *Bull. Commonw. sci. industr. Res. Organ. Aust.* No. 267, 1952. pp. 55 + 32 photos. 18 refs.

The occurrence of SiO_2 in timber is a valuable diagnostic feature and is of practical importance in connexion with resistance to attack by teredine borers and working properties of wood. More than 400 siliceous timbers belonging to 32 botanical families have been tabulated, together with their countries of origin, SiO_2 contents, and distributions of SiO_2 within the wood tissues. Where the occurrence of SiO_2 inclusions is not generically characteristic, non-siliceous species are mentioned in the text. Those timbers in which the SiO_2 contents are 0·05% or more of the oven-dry weight of the wood are considered to be SiO_2-accumulating. *Author's summary.*

2652. Kitao, K. **[Iron and manganese in rayon pulp.]** *Wood Res., Kyoto* No. 8, 1952 (1–4). 4 refs. [Jap.e.]

Contents of Fe and Mn were determined for Japanese rayon pulpwoods and in several commercial rayon pulps. In the timbers, the Mn greatly exceeded the Fe while the reverse was true for the pulps. In kraft pulping Pine, the changes in Fe and Mn content were determined for different stages including the preliminary cook in water. When good water was used the Fe and Mn in the bleached pulp was of the same order as in commercial rayon sulphite pulps. *From author's summary.*

2653. Minguzzi, C., and Naldoni, K. M. Sul presunto contenuto di tracce di arsenico nei legni: sua ricerca in alcuni legni di piante ad alto fusto. **[Supposed traces of arsenic in wood: search for it in the wood of certain trees.]** *Atti della Società Toscana delle Scienze naturali, Pisa (Memorie: Serie A)* 57, 1950 (38–48). 9 refs. [It.it.] P.R.

Wood of *Pinus sylvestris*, *Cupressus sempervirens*, *Fagus sylvatica*, *Abies alba*, *Pinus nigra* and *Castanea sativa* was finely comminuted by a circular saw made of steel containing traces of As, extracted with HCl and $KClO_3$, and then examined spectroscopically for the presence of As. Only in Cypress wood was an appreciable trace found (0·00014% after subtracting the amount present in an untreated control). The bearing of these results on (1) the presence of As in coffins, and (2) the As cycle in vegetation and soil, is discussed.

813.4. Chemical Effects of Heat. Chemistry of Thermal Decomposition

See also Nos. 2883–4.

2654. Gillet, A., and Urlings, J. Pyrolyse comparée du bois, de la cellulose, de la lignine et des houilles. 2e partie. Du bois à la houille. **[Comparative pyrolysis of wood, cellulose, lignin, and coals. 2. From wood to coal.]** *Chim. et Industr.* 68 (1), 1952 (55–60). 2 refs. [F.f.] D.S.I.R.

Includes graphed and tabulated results of pyrolysis tests conducted with: (1) native lignin obtained from the wood used in the first part of the investigation, isolated both by the method of Brauns and Hibbert, and by another method worked out by the authors (to be described in a separate paper), and (2) hygroscopic cotton (cellulose) which has been found to yield products comparable to those obtained from cellulose isolated from wood by using glycerol. It has been found that pyrolysis changes cellulose into 'pyrolysed lignin', the respective O and H curves becoming identical above 450° C., while the C curves do so above 320°. It is deduced that above 365°, the composition of the pyrolysis product points to a complete disappearance of hemicelluloses from the wood, and the product of wood pyrolysis is identical with that of the pyrolysis of lignin or of lignin + cellulose, while cellulose alone does not attain at that temperature the same degree of carbonization. The superposition of graphs of wood and coal carbonization reveals the fact that the composition of charcoal above 360°, and particularly above 550°, tends to that of semi-coke, charcoal having slightly more of each of the 3 elements than semi-coke. The considerably lower O content of coal as compared with the wood-pyrolysis residue is explained tentatively by the age-long leaching out of carbon oxides by underground waters.

814. *Natural Durability. Old Wood. Fossilized Wood*

See also Nos. 1973, 2040, 2760, 2809, 2818, 2832.

2655. Bianchi, A. T. J. Oude practijkproeven met merbau (*Intsia* sp.) in Nederland. **[Old-established service tests on *Intsia* sp. in the Netherlands.]** *Ber. trop. Prod. Inst. Trop. Amst.* No. 231, [1951]. pp. 8. [Du.e.] *Repr.* from *Weg en Waterbouw* [, *Leiden*] 11 (11/12), 1951 (121).

An examination was made in 1950, 15 years after regular inspections had ceased, of Merbau established in service in 1897–8 (then known as Ironwood, *Afzelia bijuga*). In six positions the timber had been removed as a result of war damage or traffic requirements. In one position only a fragment of the wood remained but in the other three (two lock gates and one set of sheet piling) the wood was in excellent condition. One of the lock gates had been paired with an Oak gate, which had needed renewing. This second Oak gate was in 1950 in less good condition than the original Merbau gate. The tests were not made in *Teredo*-infested areas and there is no evidence as to resistance to *Teredo*. There was no sign of corrosion of metals by Merbau. In 1935, at the last regular inspection, timber in six of the positions (lock gate, bridge decking, sheet piling and

sleepers) was in good condition, in two (bridge decking and railway posts) decay was present but the timber was still in service, while in the other two, the timber had been removed because of alterations but had been reported sound at the last inspection (1924 and 1930 respectively).

2656. KOHARA, J. **[Studies on the strength properties of old timbers. (Horyuji Temple construction timbers, *Chamaecyparis obtusa* Endlicher.) II. Influence of moisture content on strength properties.]** *Trans. 59th Mtg. Jap. For. Soc.* 1951 (244–5). [Jap.e.]

Presents graphed and tabulated results of a comparative investigation on the relationship between different mechanical strengths and moisture content in (1) samples of *C. obtusa* building timbers, ca. 1300 years old, and (2) samples of new timbers of the same species. Air-dry old timber showed greater values of compression, static bending, shear, and hardness but lower impact bending strength and cleavability than (2). The same was true for moisture content values between 0 and 40%.

815. *Effect of Growth Factors on Structure and Properties*

See also Nos. 2037, 2262, 2267, 2622.

2657. MIYOSHI, T. **Ecological studies on the qualities of the timber of 'Hinoki', *Chamaecyparis obtusa* Sieb. et Zucc.: physical and chemical properties.** *Bull. Tokyo Univ. For.* No. 40, 1951. pp. 217 + 22 photos. [Jap.e.]

Specimens from localities classified by the 'Hinoki temperature factor' [cf. *For. Abstr.* 14 (No. 2005)] were examined for their physical, chemical and mechanical properties. Mean values are given for height, d.b.h., clear length/total height, number of annual rings/cm. (*n*) and volume relative to tree age (*v*) for trees 180 years old; *n* increases and *v* decreases with height above sea level. Sapwood and heartwood are clearly marked; sapwood width is usually 2–3·5 cm., rarely exceeding 4·0 cm. even in dominant trees; average value of *n* is 8·9, or 10·4, 9·6 and 6·5 for the temperature factors A_I, A_{II} and B respectively. The summerwood (*sm*) amounts to 7·4% for all temperature factors. Young trees (0–30 years) have a high, and old trees (over 100 years) a low *sm* %. In trees from A_I (high or cold) localities the *sm* % tends to decrease with decreasing *n*, but no trend could be observed for B (low or warm) localities. Trees from the higher or colder localities show better wood quality (judged by *n*, *sm* %, radial width of *sm* per annual ring, and false annual ring %) than those from low or warm localities. The colour-tone (measured in Ostwald's apparatus) ranged from 7 to 16 and the coefficient of colour quality from 0·99 to 2·16; standard values for good-quality wood are 9·0 and 1·05 respectively. The chemical composition (shown in tables) of trees from the different temperature localities is fairly constant, but wide variations exist for individual trees. Figures for sp. gr., compressive, tensile, and shear strength, and modulus of rupture for wood from the different temperature localities are tabulated. All properties were found to be related to *n* and this may be a good index of wood quality.

2658. DĄBROWSKI, A. Wstępne określenie wpływu metod zagospodarowania lasu na fizyczne i mechaniczne własności drewna. **[A preliminary determination of the effect of silvicultural systems on the physical and mechanical properties of wood.]** *Sylwan* 96 (3), 1952 (283–304). [Pol.]

The test material was taken in March 1949 from a Pine stand (of quality I or II and age class 160–180), managed partly under (*a*) the clear-felling, partly (since 1924) under (*b*) the group-selection system. Three trees were felled from each area, and specimens taken from 3-m. logs cut at ca. $\frac{1}{3}$ of the height of each stem. Preliminary results have shown that wood from (*b*) trees has a higher specific gravity, but a rather lower strength/sp. gr. ratio, than that from (*a*) trees.

2659. CHALK, L. **Variation of density in stems of Douglas Fir.** *Forestry* 26 (1), 1953 (33–6). 9 refs.

In a disk from the stem of a very fast-grown Douglas Fir (*Pseudotsuga taxifolia*), 19 years old, with an almost constant ring-width of about $\frac{1}{3}$ inch, the density of the individual rings was almost constant from pith to bark and there was no sign of any increase outwards such as was found by Turnbull in fast-grown South African Pines. Similar results were also obtained with more closely grown material (mean ring-width about $\frac{1}{10}$ inch). There appeared to be no general relation between density and ring-width, but the highest densities occurred in rings less than 6 mm. wide in the centre of the fast-grown tree and at the outside of a tree with access to river water. [Cf. *For. Abstr.* 13 (No. 2422).] *Author's summary.*

2660. KELSEY, K. E., and BISSET, I. J. W. **Sub-projects T.P. 2–3 and W.S. 3–5. The investigation of shrinkage and density variation in relation to position in the tree. Progress report No. 23. Experiment T.P. 2–3/23 and W.S. 3–5/22. Variation of shrinkage, density and fibre and vessel dimensions with position in one tree of *Eucalyptus regnans* F.v.M.** Division of Forest Products, C.S.I.R.O., Melbourne. 1952. pp. 18 + 4 gphs. 17 refs.

Correlations are quite marked between position in the tree and the density and some fibre and vessel dimensions; at some levels there is a correlation between shrinkage and distance from the pith. The only correlation observed between fibre and vessel dimensions and physical properties was that between shrinkage anisotropy and the ratio of tangential to radial fibre diameters. The differences observed in the individual shrinkage measurements point to the need for testing numerous specimens.

82. CONVERSION, SHAPING, ASSEMBLY AND FINISHING OF WOOD: GENERAL

2661. HAYWARD, C. H. **Light machines for woodwork.** Evans Brothers Limited, Montague House, Russell Square, W.C.1. 1952. pp. 200 + vii. Price 9*s.* 6*d.*

Contains sections on: choice of machines, installation of machine transmission belts and pulleys, the circular saw, sharpening small circular saws, the small bandsaw, the jig saw, the planer, the spindle moulder, the router, sanders, powered hand tools and machine speeds.

821. *Barking*

See also Nos. 2283–5.

2662. EKLUND, R. Pohjoisamerikkalaisia metsäkuorinta- ja -lastutusmenetelmiä. **[Various barking and chipping methods in the woods of North America.]** *Pap. ja Puu* 34 (11), 1952 (429–40). 15 refs. [Fi.e.] P.R.

Describes with illustrations a number of mechanical barkers and chippers and discusses chemical barking and its cost. The photographs have English legends.

2663. JACOBSON, G. **Andersson debarker.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (118–21). I.F.B.

Describes the Andersson pneumatic barker, its operation, performance, and some cost and production rates for different models. [Cf. *For. Abstr.* 14 (No. 675).]

2664. BELJANINA, G. G. Stanok dlja okorki špal. **[Machine for the barking of sleepers.]** *Lesn. Prom.* 11 (4), 1951 (30–1). [Russ.]

An illustrated description of the first working model of a machine designed by the author. Its over-all dimensions are 770 × 200 × 250 cm. The cutters, guided by a templet, remove a layer of uniform thickness from the curved surface of the sleeper. The normal feed rate is 11 m./min., against a power consumption of 9·6 KW. Operated by 4 workers, the model barks 1200 sleepers/shift. It is undergoing improvements.

2665. WULTSCH, F., and SALZER, H. Untersuchungen über die Eignung der Nassentrindungsverfahren für ungeflösstes Alpenholz. **[Investigations on the suitability of methods of wet barking for unfloated Alpine wood.]** *Papier, Darmstadt* 6 (5/6; 7/8; 9/10), 1952 (75–80; 115–9; 169–76). [G.] L.S.

Wood from Upper Carinthia was barked in 4 Austrian pulp and paper mills, using 4 different barking machines: Kamyr's continuously-operating, friction-drum barker, Thorne's friction barker with a device for rotating the logs, a hydraulic barker [make unspecified], and Schongau's friction-hydraulic barker. Investigations related to the determination of loss in barking, efficiency of machines, and power consumption, for material of different diameter, felling time, and storage periods, and also for logs complete with bark, logs with bast only, logs with heart or superficial rot, and curved pieces. (1) Tests with the Thorne machine showed that: (*a*) wood of larger is more easily barked than that of smaller diameter; (*b*) the peeling effect depends partly on the duration of the barking process but even more on the degree of bast-softening prior to barking, and upon the duration of storage; and (*c*) hot-water softening so facilitates barking that 6 hours of softening treatment allows 100% barking of winter-felled wood of small diameter and short storage duration. (2) It was found for the hydraulic barker that: (*a*) it gives excellent results with freshly felled (spring, summer, or autumn felling) logs, and also with logs stored for a long time with bark on, and with winter-felled logs if stored for over 2 years; (*b*) its output and the loss of wood depend upon the duration of storage and the quantity of bast; (*c*) the machine is not suitable for unfloated winter-felled Alpine logs that come to it direct after felling or after short storage; to increase the ease of barking of winter-felled logs, they may be softened in warm water and sulphite liquor; (*d*) its efficiency depends to a large extent on the amount of bast; (*e*) it is unsuitable for diameters below 12 cm., for over-dried, cracked wood, or for wood with heart or surface rot. (3) Full data on the performance of the Schongau water-jet friction-hydraulic barker were given by Brecht [cf. *For. Abstr.* 10 (No. 2660)]. Further findings are that: (*a*) green winter-felled logs, pre-softened for 6 hours, can be completely freed from both bast and bark; and (*b*) for stored, winter-felled logs, 2–4 hours' softening is required for wood with bast, and only 1 hour for wood with bark also, to remove bast or bark completely. (4) Tests with the Kamyr friction-drum barker have shown that its efficiency depends on many factors, e.g. the duration of storage in stationary or flowing water, amount of adhering bark, time elapsed between taking out of water and barking, volume of wood loaded into the barker, smoothness of the inner walls of the barker, and its speed of rotation, degree of wetting of the wood, and whether the wood was or was not frozen. It was found that: (*a*) this barker is not suited to winter-felled Alpine logs not previously softened, but is suitable for pre-softened (in particular hot-water-softened) wood; (*b*) barking efficiency is greatly dependent on log diameter; and (*c*) a 6-hours' softening in hot water with subsequent cold-water treatment is sufficient to effect complete removal of bark, irrespective of the storage period, felling time, or site. (5) Tests with all 4 barkers show that suitable pretreatment can generally ensure the complete removal of bast from unfloated winter-felled logs. The treatment used involves softening in water at 98° C. followed by a brief cold-water soak. (6) The author finally concludes that: (*a*) the hydraulic barker should not be used in localities where both electric energy and wood are expensive, nor for diseased and small wood; on the other hand, it is to be recommended for wood of large diameter with intact bark, in places where labour is expensive; (*b*) the Schongau barker should be used in localities where wood is dear but power and labour are cheap, particularly in smaller plants; (*c*) the Thorne and Kamyr barkers are particularly suitable for large outputs and for places where wood is cheap but power and labour are dear.

822. *Saws and Sawing*

See also Nos. 2633, 2712 *et seq.*

2666. PRICE, J. T. **Principles of conversion.** In *Timber Progress and Desk Book for 1953*, Cleaver-Hume Press, London. 1952. pp. 144–52.

The chief factors in cross-cutting and sawing up logs are discussed.

2667. MIKIT, È. A. Povysitj proizvoditeljnostj kruglyh pil prodoljnogo pilenija. **[To increase the efficiency of circular rip-saws.]** *Lesn. Prom.* 12 (4), 1952 (31–2). [Russ.]

Experiments show that the increase of the hook angle reduces the power consumption of circular

rip-saws to a greater extent than the increase of the tooth spacing (or reduction of the number of teeth). Recommends a hook angle of 38–40° for softwoods, and 30–36° for hardwoods.

2668. Sugihara, H. **[A study of relations between sawing force and feeding force in band sawing.]** *J. Jap. For. Soc.* 34 (1), 1952 (7–9). [Jap.e.]

Results, showing the relationships between feeding force, sawing force and depth of cut for air-dry Sugi of different sawing widths, are given in graphs with English legends.

2669. Druckluft-Handsäge. **[A compressed-air handsaw.]** *Holztechnik* 32 (12), 1952 (638). [G.] P.R.

Illustrated description of a new saw 116·8 cm. long and weighing ca. 7 kg. The built-in compressed-air motor (working pressure 6–8 atm.) has a diameter of 8·3 cm. and consumes ca. 2 cu.m./min. of air. The saw has twin close-set reciprocating chromium-steel blades of 53 cm. cutting range and 4·8 mm. kerf. The saw is particularly suited for underwater work.

2670. Kolobov, V. D. Gidravličeskoe natjaženie ramnyh pil. **[Hydraulic tensioning of frame-saws.]** *Lesn. Prom.* 11 (10), 1951 (25–8). [Russ.]

Illustrated description of a new hydraulic apparatus recently designed by the Central Institute of Scientific Research on Mechanical Wood Processing, U.S.S.R., for maintaining automatically the strain on frame-saw blades during operation; it is claimed that the original excess strain applied to compensate for the lengthening due to friction heat can be considerably reduced. The apparatus (GARC-1) has been tested on 14 frame-saws, each apparatus being used on the average during 86 changes of blade-sets. Thinner blades (No. 15, 1·70–1·83 mm. gauge) can be used, reducing the kerf from 3·6 to 2·9 mm., the yield of timber is increased, and the time spent on tautening the blades is saved. The apparatus consists of (1) a metal body with 24 pairs of finger pistons transmitting the oil pressure to the tensioned blades, (2) a pressure cylinder with screws for generating the required pressure, and (3) a cylinder for a spring-loaded pressure accumulator. The pressure inside the apparatus does not usually exceed 500 atm. The apparatus can be used for blade assemblies up to 400 mm. wide. Work to improve the design and eliminate some defects observed during trials is being continued.

2671. Beršadskiĭ, A. L. Rasčet povyšenija posylok pri pilenii ramnymi pilami s pljuščennymi zubjjami. **[Calculation of the feed increase when using frame-saws with swaged teeth.]** *Lesn. Prom.* 12 (3), 1952 (20–6). [Russ.]

Discusses the differences between swage- and spring-set teeth in frame saws, and findings of the author on relative gullet capacity. [Cf. *For. Abstr.* 13 (No. 2465).]

2672. Beršadskiĭ, A. L. Skorostnoe rezanie s ponižennym potrebleniem energii. **[High-speed cutting with reduced energy consumption.]** *Lesn. Prom.* 11 (5), 1951 (25–8). [Russ.]

The increase of circular-saw speeds increases the energy consumption; so does an increase in the feed rate. Thus when the speed is doubled, the energy consumption increases 1·5 times; if the feed rate is raised 30%, the total energy consumption is 1·9 times that of the previous figure. Although the increase of power required is justified by the increased efficiency, many plants have no power reserve to attain this improved performance. It is, however, possible to obtain increased efficiency with a reduced power consumption, viz. by reducing the height of some of the teeth, so that, with the increased sawing speed and feed rate, the chip thickness does not exceed 1·4 mm. This figure has been found from experience to be the maximum chip thickness consistent with good cutting. Several numerical examples are given, with a nomograph for ascertaining the power required if the following magnitudes are known: feed rate, tooth spacing, and saw speed.

2673. Turnbull, R. F. **Sawing chains.** *Aust. Timb. J.* 18 (8), 1952 (661 . . . 673).

Discusses the maintenance of chain-saw blades and gives photographs showing the surface obtained on woods of different densities cut with chains having zero hooks, — 4° hook and — 8° hook.

2674. Ickovič, E. A. Prifugovka zubcov ramnyh pil. **[Jointing of frame-saw teeth.]** *Lesn. Prom.* 11 (6), 1951 (27–30). [Russ.]

Results of comparative tests on the performance of frame-saw blades whose teeth have been (1) jointed, following the usual sharpening, (2) sharpened only, showed that: (*a*) the area of wear of the front edge and the absolute wear (shortening of the tooth) are less for (1) than for (2); (*b*) the area of wear of the back edge of the tooth is less for (1) than for (2) during the first 2 hours of operation, after which the values differ little; (*c*) the optimum value of the length of the jointing facet is 0·1 mm. Tests conducted with a specially designed pendulum-impact machine have confirmed the results of actual sawing tests. The author recommends jointing the teeth by moving a fine-grained grinding wheel or a 'velvet' file upwards along the saw-blade; after 2–2·5 hours' sawing the blade should be re-jointed in the frame, and a further spell of work of 1·5–2 hours is possible.

2675. Andrievskiĭ, A. I. Universaljnyĭ zatočno-fugovočnyĭ stanok CNIIMÈ. **[The CNIIMÈ universal sharpening and jointing machine.]** *Lesn. Prom.* 11 (9), 1951 (15–7). [Russ.]

Illustrated description of a new hand-operated accessory for the sharpening and subsequent jointing of chain-saws. It removes from the sharpened teeth a metal layer of 0·1 mm., thus raising the number of permissible sharpenings of chain-saws to 90. Tests show that the sharpening is done extremely accurately. The sharpened chain-saws have sawn up to 64 sq. cm./sec. of clean cut.

823. *Planing, Cutting of Mouldings. Chiselling, Mortising and Tenoning. Boring. Turning*

2676. **A special profiler.** *Timb. Tr. J.* 204 (3985), 1953 (625–6).

Describes modifications in a German machine used at Roehampton hospital to rough out the wood filling of artificial limbs.

2677. HORDERN, R. H. **The cutter projection scale and its application to cutter setting and grinding.** *Wood* 17 (11; 12), 1952 (442–5; 488–90).

824. *Forms of Joint. Jointing and Assembly*

824.1. Nailed Joints

See No. 2632.

824.6. Carpenters' and Joiners' Joints

2678. LINDENTHAL, W. **Wood swelling composition and a joint produced therewith.** *U.S. Patent* No. 2,580,308, Dec. 25, 1951. pp. 6. P.O.

A joint of a mortise-and-tenon type, at least one of whose members is of wood, and at least one other is impregnated with a composition consisting of 4–12 parts of natural resin of acidic character, 4–12 parts of an oxygenated solvent of low molecular weight, and 2–8 parts of a basic substance.

824.8. Glues and Gluing

See also Nos. 2731, 2735–6, 2797–8, 2844.

2679. FYSH, D., and JONES, E. C. **Animal glues for wood: 1. The properties of animal glue. 2. Glue in wooden joints. 3. Preparation and methods of application.** *Wood* 17 (11; 12), 1952 (424–7; 469–72); 18 (1), 1953 (15–8).

2680. Studia nad klejami sklejkowymi. Praca zbiorowa. **[Studies on plywood glues. A symposium.]** *Prace Inst. Bad. Leśn.* No. 81, 1952. pp. 72. [Pol.russ.]

Contains papers on: The effect of lime content and mixing temperature on the viscosity and durability of albumen glue (*T. Perkitny* and *M. Wnuk*); Effect of the time of stirring and the degree of dilution with water on the viscosity and durability of albumen glue (same authors); Adaptation of fish glue in flake form to wood-gluing (*J. Lipski*), and Analysis of the suitability of the Polish type-L fish glues for mass production of plywood (*T. Perkitny* and *Z. Chudzinski*).

2681. TAKASHIMA, T. **[Researches on blood glue (4th report). Hot pressing of blood plasma glue (1).]** *J. Jap. For. Soc.* 34 (6), 1952 (182–5). 5 refs. [Jap.e.]

Discusses tests showing optimum conditions for gluing Birch plywood with blood plasma glue.

2682. TAKASHIMA, T. **[Researches on blood glue (6th report.) On hot press[ing] whole blood glue.]** *J. Jap. For. Soc.* 34 (10), 1952 (310–3). 6 refs. [Jap.e.]

Gluing strength was increased by adding a small amount of alkali (especially NaOH and CaOH) to the blood. Conditions for plywood of 3 plies of 1·5-mm. Birch veneer were: 12–15 min. pressing, temperature 110–120° C., pressure ca. 15 kg./sq. cm. and amount of glue spread 0·02–0·025 g./sq. cm. (one face). Ratio of water to dried blood glue material should be within 2/1 by weight. With the addition of a reasonable amount of alkali, the working life of the mixture is fairly long, and maximum gluing strength can be reached in a few hours after the glue is mixed. Best results are obtained by delaying the application of pressure for 20–40 min. after the glue is spread.

2683. MEAKIN, K. S. **Synthetic resin adhesives.** In *Timber Progress and Desk Book for 1953*, Cleaver-Hume Press, London. 1952. pp. 71–81.

A general account, with special reference to setting resins.

2684. HORIOKA, K., and FURUSE, M. **[Plywood studies. (1) On water-proof plywood glued with cold-setting phenol-formaldehyde resin.]** *Trans. 59th Mtg. Jap. For. Soc.* 1951 (264–6). [Jap.e.]

Results of tests conducted with 'Solidite No. 1' cold-setting phenol-formaldehyde resin glue (resin content, specific gravity, surface tension, permeability, behaviour with extenders and hardeners, optimum temperatures and times, etc.).

2685. HORIOKA, K., and SUGANO, M. **[Plywood studies. (2) On highly water-resistant plywood glued with urea-formaldehyde resin.]** *Trans. 59th Mtg. Jap. For. Soc.* 1951 (267–8). [Jap.e.]

Gives results of tests with 10 commercial urea-formaldehyde resin glues (physical and chemical properties, rate of spread, pressure and temperature requirements, effect of veneer moisture content, hardeners, gluing strength, fillers and extenders).

2686. GOTO, T., and KADITA, S. **[Filling urea resin adhesives with anhydrous gypsum.]** *Wood Res., Kyoto* No. 8, 1952 (83–95). 45 refs. [Jap.e.]

Results of an investigation on the setting of urea resin adhesive with a filler of anhydrous gypsum ($CaSO_4$) on the shear strength of Birch plywood glued with it are given in tables and graphs having English legends. Plywood shear strength and wood failure were slightly inferior when adhesive with 10–20% by weight of gypsum was used, but setting and spread of adhesive were improved. Shear strength and wood failure of Birch plywood panel bonded with adhesives consisting of (1) 100 parts liquid urea resin without water or gypsum and with a solid content of 70% and (2) 100 parts urea resin to 10 parts gypsum and 10 parts water and with a solid content of 66·7%, fulfilled the requirements of the Japanese plywood export specification No. 60.

2687. NODZU, R., GOTO, R., and KOZAI, Y. **[Studies on wood adhesives III. Application of acetone-formalin resin as an adhesive. 3.]** *Wood Res., Kyoto* No. 8, 1952 (13–22). 3 refs. [Jap.e.]

Gives results of experiments on different fillers. [Cf. *For. Abstr.* 13 (No. 669).]

2688. GOTO, R., and KOZAI, Y. **[Studies on wood adhesives. IV. Application of acetone-formalin resin.]** *Wood Res., Kyoto* No. 8, 1952 (23–7). 4 refs. [Jap.e.]

Makes recommendations on pressing temperatures and times, and on pressures.

2689. NAKATSUKA, T., and WATANABE, C. **[Experiments on viscose wood adhesive.]** *J. Jap. For. Soc.* 34 (10), 1952 (307–9). 2 refs. [Jap.e.]

2690. BECKUM, W. C. VAN, and COOK, H. L. (to Weyerhaeuser Timber Company). **Method of bonding plywood, an adhesive therefor and a process of making it.** *U.S. Patent* No. 2,574,803, Nov. 13, 1951. pp. 8. P.O.

The spreadable adhesive is essentially the reaction product of comminuted parenchyma tissue, bark powder from bark phloem, and an aqueous solution of a basic acting soluble compound of an alkali metal (e.g., NaOH, Na_2CO_3) conferring on the dispersed mass a pH of 3·5–10.

2691. MAKU, T. **[Calculation of inner temperature in a hot-press.]** *Trans. 59th Mtg. Jap. For. Soc.* 1951 (262–3). 2 refs. [Jap.e.]

Results are given of tests with Hinoki (*Chamaecyparis obtusa*) and Birch veneers, glued with phenol resin glue in a hot press at 140° C., and with soya-bean glue at 100°. These are compared with theoretical values obtained from the author's formula. [Cf. *For. Abstr.* 12 (No. 366).]

2692. PERRY, T. **Practical answers about glue.** *Wood, Chicago* 57 (11), 1952 (29, 49–50, 52, 54). P.R.

The first of a series on practical glue problems. Deals with the following subjects: (1) Why is glue spread in ridges, rather than as an over-all film; (2) What is the approved shape and spacing of grooves in spreader rolls for different types of glues? (3) How often do rubber roller spreaders have to be regrooved? (4) Is the spread best regulated by the tension between rollers or do the doctor rolls give the most reliable adjustment? (5) How often should glue spreading ratios be tested, and what is the simplest method? (6) How can thin veneers be kept from wrapping round the spreader rolls? (7) How to increase the spreadable life of resin adhesives when the temperature in summer is 20–30° F. higher than the optimum temperatures for these adhesives? (8) What is the proper linear speed for passing veneers through spreaders to obtain uniform spreads? (9) Are recirculating pumps to be recommended for resin glues?

2693. YAVORSKY, J. M. **Radio frequency burning in glue joints.** *J. For. Prod. Res. Soc.* 2 (4), 1952 (29–32, 71). P.R.

The R.F. voltage levels which appear to be thresholds of burning can only be considered approximations, as results are not always reproducible. It appears that the burning is a dielectric phenomenon. Factors that may affect the frequency and intensity of burning are discussed.

2694. GRAHAM, P. H. **Electronic gluing. Part 2. Edge gluing.** *Wood Wkg. Dig.* 54 (Nov.), 1952 (78 . . . 111). P.R.

A survey of equipment and applications.

2695. EGNER, K., and BRÜNING, H. Herstellung von Weichenschwellen durch Keilzinken-Verleimung im hochfrequenten Kondensatorfeld. **[Manufacture of railway crossing sleepers by gluing indented joints in an R.F. condenser field.]** *Holz Roh- u. Werkstoff* 10 (8), 1952 (319–23). 5 refs. [G.g.] P.R.

A summary of the previous work of the first author on the use of glued indented joints in large-section structural members and railway sleepers is followed by an illustrated description of partial (end) drying of sleepers and their glue curing in an R.F. condenser field. It has been found that transverse drying (electrodes placed on the opposite wider faces near the end of the sleeper) is less effective than 'longitudinal' drying (one electrode surrounding the sleeper at a certain distance from the end, while the other, quite small, is placed in front of the end face). Strength tests have shown that the glue best adapted for the weather conditions that a sleeper must withstand is the resorcinol resin glue Aerodux 185 (Swiss make), but fairly good results have been obtained with phenolic glues P600 and H410 (German make). Tests conducted with Aerodux 185 on green (moisture content over 40%) sleepers have shown high binding strength, in both cold and hot gluing.

825. *Cleaving. Adzing. Mechanical Comminution*

See also Nos. 2662, 2863, 2886.

2696. ARHANGELJSKIĬ, V. D. Soprotivlenie drevesiny izmeljčeniju. **[Resistance of wood to comminution.]** *Lesn. Prom.* 11 (12), 1951 (24–5). [Russ.]

The resistance of wood to comminution is defined as the ratio of the energy used for comminuting 1 kg. of wood to the increase in wood surface, expressed in conventional units; another definition is the ratio of the energy used to the efficiency of the machine, as expressed by the fraction (kg./hour) of the product passing through the sieve of desired mesh size. Tests showed that, when sawdust of different composition was subjected to comminution to 3 degrees of fineness (Soviet sieves 250, 180, and 150 [probably mesh size in μ]), Birch sawdust had specific resistances to comminution of 0·38, 0·57, and 1·23; Pine, 0·32, 0·09, and 1·02; Fir, 0·47, 0·71, and 0·82; Pine/Birch mixture, —, 0·47, 0·79; Fir/Birch, 0·54, 0·57, 0·72, and Pine/Fir, 0·44, 0·62, 0·71, respectively; the mixtures being taken in the ratio 1/1. The third figure (corresponding to No. 150 sieve) is the most characteristic for the species involved. It is significant that 1/1 mixtures display a resistance to comminution smaller than that of either component alone.

827. *Bending. Moulding (other than by Cutting)*

See also No. 2736.

2697. WANGAARD, F. F. **The steam bending of Beech.** *J. For. Prod. Res. Soc.* 2 (4), 1952 (35–41). 17 refs. P.R.

An introductory part dealing with the principles of steam bending, preparation of wood for bending, methods of bending, and setting of the bend, is followed by a discussion of the bending characteristics of Beech and recommended practice in bending and drying Beech.

2698. TURNER, N., and DEAN, A. R. **A new type of bent corner.** *Wood* 17 (12), 1952 (462–8). [Forest Products Research Laboratory, Princes Risborough.]

Describes a method [cf. *For. Abstr.* 14 (No. 1560)] in which most of the portion that would normally form the concave face is removed and an insert of low-density wood, with its grain parallel to the axis of curvature, is fitted into the recess. The exposed face of the insert is then moistened and the assembly bent round a jig, or glue is spread on the exposed

face and on the plywood, and a supporting veneer bonded to them during the bending operation. The ratio of the radius of curvature/thickness of assembly is shown for inserts of Balsa, Bombax (*Bombax buonopozense*), Erimado (*Ricinodendron africanum*), Sitka Spruce, Poplar (*Populus nigra*), Agba (*Gossweilerodendron balsamiferum*) and Beech, with Canadian Birch, Gaboon, or Walnut as the supporting veneer. For bends with an inner radius of not less than 1 in., where the total thickness of the assembly does not exceed ca. 0·375 in., as in some radio cabinet corners, Balsa, Erimado, Bombax, *Cavanillesia platanifolia* give good results, while *Ricinodendron rautanenii*, *Herminiera elaphroxylon* and perhaps *Schizolobium parahybum*, none of which is imported in large quantities, are promising. *Triplochiton scleroxylon*, Poplar, *Octomeles sumatrana* and Agba have proved less suitable. There is some indication that quarter-cut timbers of higher density, e.g. Sitka Spruce, Scots Pine and Western Red Cedar, might be suitable. It appears that any wood of over 27 lb./cu. ft. is likely to be unsuitable and that those of 17 lb./cu. ft. and less are likely to be satisfactory. No wood has yet proved better than Balsa. Low-density insulating boards (ca. 18 lb./cu. ft.) have also given good results, but corners are likely to be weaker than where wood is used for the insert. There are two possible methods of making the flat-glued assembly: the plywood can be recessed and the insert glued into place, or the face veneer and crossbanding (when needed) can be bonded in one pressing operation to two pieces of plywood and to the insert separating them. Different methods of bending can be used. The main advantages of the new method over others in use is that the corner is of the same thickness as adjacent material, it is smooth on both concave and convex sides, and it saves timber. The main disadvantage is possible scarcity of suitable material for inserts. A patent application is pending.

829.1. *Finishing*

See also Nos. 2649, 2776, 2852.

2699. GRAHAM, P. H. **Lumber distortions should be faced before surfacing.** *Wood-Worker, Indianap.* 71 (10), 1952 (30 . . . 36). P.R.

Describes the use of modern facing equipment.

2700. ORTH, R. Verfahren zur Bleichung von Holz. **[Method of bleaching wood.]** *German Patent* No. 825,312, Dec. 17, 1951. pp. 2. [G.] P.O.

Before H_2O_2 treatment, Spruce or Pine wood is pretreated with a KOH or NaOH solution. The method can also be used for Oak and Beech, or Maple with dote.

2701. SWAN, R. J. **The brush-backed rotary head.** *Wood* 18 (1), 1953 (30–2).

Describes the tool, which is in principle a tongued or fingered type of abrasive, backed by a brush of fibre, nylon or other flexible material. The brush rotates, carrying the abrasive with it, and as any particular contour comes into contact with the brush, the brush in conforming to that shape forces the fingered abrasive to do the same.

2702. JUŠMANOV, T. M. Probki na židkom stekle. **[Gluing of plugs with water-glass.]** *Lesn. Prom.* 12 (5), 1952 (26). [Russ.]

Where casein glue cannot be used in the plugging of knot-holes because of the low temperature (Arctic regions), water-glass or bakelite lacquer (varnish) are good substitutes.

2703. GENTES, F. H. **Latex as a film forming medium for surface coatings.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (28–9). I.F.B.

Outlines the mechanism of latex [any dispersion of high-polymer solids of minute particle size in water] formation and the developments so far attained. These include the priming of porous hardboard surfaces and of fire-resistant coatings for insulation board.

2704. WAMPNER, H. L. **Phenolic resin finishes.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (30–1). I.F.B.

A general account of the characteristics and nomenclature of phenolic varnishes, and their various modifications.

2705. PIERNICK, E. I. **Film forming properties and applications of vinyl and acrylic resins.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (35–7). I.F.B.

A general account.

2706. BROWN, R. C. **Epon resins for surface coatings.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (32–4). I.F.B.

Outlines the physical, chemical, and technological properties of Epon resins (condensation polymers made from epichlorohydrin and bisphenol), and their uses.

2707. FUKUYAMA, M., and KADITA, S. **[On the effects of paint-coating upon the moisture absorption of wood.]** *Trans. 59th Mtg. Jap. For. Soc.* 1951 (251–3). 7 refs. [Jap.e.]

The results of a study on the effect of paint coats ('Cashew', a Japanese-lacquer substitute; phenol-formaldehyde resin) on the sorption of water and moisture by wood (*Fagus crenata* and *Prunus pubifolia* var. *spontanea*) have shown that: (1) resistance to both sorption and swelling increases for each paint parabolically with the average thickness of the film; (2) resistance to sorption decreases gradually as the period of sorption increases; (3) resistance to swelling with increase of film thickness is more pronounced in the tangential than the radial direction, and (4) 'Cashew' is more effective than phenol-formaldehyde resin. *From authors' summary.*

83. TIMBER MANUFACTURING INDUSTRIES AND PRODUCTS. USES OF WOOD AS SUCH

831. *Fuelwood and Various Types of Rough Timber*

See also Nos. 2566, 2568, 2664, 2695, 2774, 2784–7, 2803.

2708. Zustand des Gleisnetzes, Schwellenbedarf der Bundesbahn und Preisentwicklung auf dem Schwellenmarkt. **[State of the permanent way, sleeper requirements of the Federal railways and price trends on the sleeper market.]** *Holzschwelle, Berlin*

1952 (5). From *abstr.* in *Z. Weltforstwirt.* 15 (4), 1952 (178–9). [G.]

Includes figures showing stocks of wooden sleepers for 1946–52, and costs of untreated sleepers, from 1913 to 1951.

2709. STEINWEDE, A. Die Lebensdauer von Holzschwellen. [**The life of wooden sleepers.**] *Eisenbahnbau, Berlin* 1951 (11). From *abstr.* in *Z. Weltforstwirt.* 15 (2), 1952 (76). [G.]

Gives examples of reduction of wear on German railways by the use of new plates and screws for attaching the rail to the sleepers, and of the use of preservatives.

2710. RADIVOJEVIĆ, R. Železnički pragovi od cerovine. [**Railway sleepers from *Quercus cerris*.**] *Šumarstvo* 5 (3), 1952 (220–1). [Serb.f.]

Q. cerris has now been accepted for making sleepers in Jugoslavia. Ten sleepers impregnated with $ZnCl_2$-cum-creosote were put in the line in 1933; when two of them were tested in 1951, it was found that both preservatives were distributed evenly throughout the wood and that both sleepers (one from a curve) were in a very good condition. The remaining 8 sleepers had at least another 7–10 years' expectation of life. Compared with other woods, in particular Beech, the wood of *Q. cerris* is impregnated better and more easily. It is estimated that the existing stocks of this species (in mixed stands with *Q. robur* and *Fagus sylvatica*) can supply ca. 50,000 sleepers yearly. They will probably be 5–10% cheaper than Beech.

832. *Mills, Their Functions and Products*

832.1. Sawmills and Planing Mills

See also Nos. 2576, 2633, 2666 *et seq.*

2711. **1952 Addendum to the British Sawmilling Classification of Timbers.** National Sawmilling Association, London. 1952. pp. 20. Price 2*s.* 6*d.*

Contains corrections to the first edition [cf. *For. Abstr.* 13 (No. 679)], an index of additional trade names, additions to the botanical glossary, and sawmilling classification of additional timbers.

2712. BEDNALL, B. H. **Milling and marketing of Radiata Pine in South Australia.** *Aust. Timb. J.* 18 (8), 1952 (595 . . . 605).

Includes descriptions of some of the sawmills handling *P. radiata*, their equipment and their products.

2713. DOUGHTY, H. V. **Modern development in sawmilling equipment.** *Aust. Timb. J.* 18 (8), 1952 (606 . . . 616).

Describes in detail the lay-out of a mill using the Christensen-Crozier edger [cf. *For. Abstr.* 12 (No. 1312)] for small logs.

2714. HYLER, J. E. **Sawmill carriages and auxiliaries.** *Sth. Lumberm.* 185 (2313; 2315; 2317; 2319; 2321), 1952 (41–3; 56 . . . 61; 58 . . . 66; 60 . . . 64; 298 . . . 302).

2715. WHITAKER, J. D. **A home-made mobile sawmill.** *Malay. Forester* 15 (4), 1952 (179–80 + 2 photos).

Describes a saw-bench mounted as an extension to a 4-wheel-drive lorry, capable of taking a saw 4 ft. in diameter. A power take-off has been added just behind the gear-box, so that the drive can be transmitted either to the wheels or to the saw-bench.

2716. SMITH, W. R. **Never lift a board.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (32–5).

Describes mechanical devices used in a small hardwood concentration yard to reduce labour costs. Besides the orthodox fork-lift trucks, roll conveyors, etc., a lumber scale board, invented by the author, is described, that supersedes the conventional lumber scale stick. The results are shown of an experiment on air-drying of 4/4 Poplar lumber in package units; the rate of drying in different positions in the packages indicates that the air currents and drying rates in package units differ from those in the old type of drying pile.

2717. KRALJIĆ, B. Pokazatelji iskorištenja drva u pilanarstvu i tehnički uspjeh piljenja. [**Indices of wood utilization in the sawmill industry and technical efficiency of the sawing process.**] *God. Zborn. zemj.-šum. Univ. Skopje* No. 3, 1951 (123–43 + 3 tbls). 2 refs. [Croat.croat.g.f.]

Criticizes a paper by Vujičić [see *For. Abstr.* 13 (No. 683)] and attempts to develop improved indices of efficiency of utilization in sawmilling. Examines, with formulae and discussion, various possible measures of efficiency, viz.: (1) indices of quantitative recovery of sawn products from the log; (2) indices of average quality of sawn products, and of qualitative recovery, both using sale value to express quality; and (3) the index of general utilization, expressed as a coefficient which is the ratio of the totals of the weighted average sale values of the individual sawn products and the corresponding average sawlog values. Discusses the possible application of (3) and derived expressions in appraising technical efficiency, and in the standardization of utilization in the Jugoslavian sawmilling industry, tabulating tentative figures for Oak, Beech and Ash.

2718. BENNETT, H. D. **Why sawing big logs means more profits.** *Wood, Chicago* 57 (7), 1952 (32, 34). P.R.

Tabulates the results of studies made by the Forestry Division of Appalachian Hardwood Manufacturers, Inc., on the costs and returns of sawing large (14 in. diam. or more at the small end) and small (6–13 in. small end) logs, in both band- and circular-saw mills. Outturn was based on the Doyle Rule. It was found that the large over-run obtained from small logs merely increases the volume of low-grade material; using the same amount of labour, production per unit of time is 60% greater in sawing large than in sawing small logs; the % of grades of No. 1, 'common' and better is nearly 3 times as great in large logs as in small.

2719. KRAMER, P. R.; LEAR, W. L. **Logs and lumber: the relation between hardwood log size and the size of lumber produced by circular mills.** *Sth. Lumberm.* 185 (2321), 1952 (192–5). 1 ref.

In one of two independent sawing studies on fairly poor-grade logs, sawing was done to obtain

maximum grade yield; while in the other there was less emphasis on grade and an effort was made to produce board widths in multiples of 3 in. In both it was found that no differences in lumber lengths or widths could be related to species or log grade, but the anticipated correlations between board width and log diameter, and board length and log length were obtained. Only reasonably sound logs were included and the effect of rot was disregarded. Length yields were clearly lower in sawing for maximum grade yields, but the difference was less for log lengths approaching the 8 ft. standard minimum length for hardwood sawlogs than for longer logs. The average width of boards was less affected by sawing for grade.

2720. Egund, K. F., and Adrian, S. Prøveskæringer i bøg 1951. **[Test sawing of Beech, 1951.]** *Rapp. Træindustr. ForsknUdv.* No. 1, 1951. pp. 31. [Dan.] P.R.

Recovery studies were made at 6 sawmills, using different types of saw (circular, band, horizontal band, horizontal, frame etc.) and producing planks, sleepers and squared timber and fuelwood. Results are tabulated and discussed but are on the whole on too small a scale to be conclusive. Recommendations for further research are made.

2721. Šapoval, A. P. Povyšenie vyhoda kačestvennyh bukovyh pilomaterialov. **[Increased output of good-quality Beech lumber.]** *Lesn. Prom.* 11 (10), 1951 (29–31). [Russ.]

Experimental rip-sawing of Beech logs 20–48 cm. diam. in a wood-conversion combine in Transcarpathia (Ukraine) showed that: (1) the quantity of raw material required for 1 cu.m. of converted timber of desired dimensions and good quality is 2·18 cu.m. for 1st-quality, 2·94 cu.m. for 2nd-quality, and 7 cu.m. for 3rd-quality logs; (2) the total yield of unedged sawn material is 70, 69, and 56·5%, respectively, the maximum quantities being found in the sawn-timber groups I/II, III, and IV, respectively. A high utilization % can be attained if more unedged Beech boards are used for the construction of agricultural machines, trucks, and lorries.

2722. Vlasov, G. D. Novyĭ metod rasčeta planov raskroja pilovočnyh breven. **[A new method of calculating the spacing of frame-saw blades in primary conversion to give a high recovery of lumber of particular dimensions.]** *Lesn. Prom.* 12 (8), 1952 (17–25). 2 refs. [Russ.]

Presents a scheme, in 4 stages, based on a detailed analysis of the raw material in terms of the desired assortments. Each stage is illustrated by tabulated examples.

2723. Mokeev, P. I. O dvuhpostavnoĭ raspilovke. **[Sawing with twin blade sets.]** *Lesn. Prom.* 11 (2), 1951 (27). [Russ.]

Suggests rip-sawing of small-diameter (8–23 cm.) logs in pairs, using frame-saws of 50–75 cm. inside frame-width. Even with the thicker logs, the number of blades in the two sets will not exceed 14–16, which is quite practicable with modern frame-saws. Discusses the technological and economical aspects of the suggestion. In resawing, frame-saws should saw the products of the first sawing, two at a time, one on top of the other, in order to cope with the increased output of the head saws.

2724. Connor, R. M. **Packaging and handling of lumber, dimension and hardwood flooring at a hardwood sawmill, furniture factory and flooring plant.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (28–31). P.R.

Discusses up-to-date methods of packaging and handling as well as some problems of installation, with special reference to Northern Hardwood conditions. A note on trials with grooved stickers is included.

832.2. Veneer and Plywood Mills, including the Manufacture of Composite-Wood Assemblies

See also Nos. 2267, 2679 *et seq.*, 2738–42, 2744, 2746–7, 2796–8, 2836, 2851–2, 2854, 2872.

2725. Hess, R. W. **Use of tropical woods in veneer and plywood.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (194–9). P.R.

Discusses some tropical hardwoods with respect to their grain features, colour, hardness, and behaviour on veneer-cutting machines.

2726. Seidel, G. A. **Soaking and steaming of peeler logs.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (200–4). 4 refs. P.R.

Discusses the heating cycles and merits of the following systems: hot water, steam, and 'pressure cooker'.

2727. Stenvall, T. Eräitä käyriä viilusorvin karojen kierrosluvun merkityksestä. **[Some curves showing the importance of the number of spindle revolutions in a veneer lathe.]** *Pap. ja Puu* 34 (12), 1952 (460–2). [Fi.e.] P.R.

Curves are given showing the relationships between (1) the effective turning time and number of revolutions for different log diameters, (2) log diameter, number of revolutions and peripheral speed, and (3) effective turning time and peripheral speed for different log diameters. The following equations are given:

$$t = \frac{(D-d)\ 60}{2 \times s \times n}$$

where t = effective turning time, D = log diameter, d = core diameter, and s = veneer thickness, n = spindle revs./min. and $t = \frac{60 \times l}{v}$ where l = veneer length and v = peripheral speed. Increasing the spindle rate will give a comparatively small increase in production because effective turning time is only a small part of total turning time, which includes a number of factors, e.g. fixing the log, that are unaffected by spindle rate.

2728. Bethel, J. S. **Hardwood veneer drying.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (205–15). 12 refs. I.F.B.

Discusses the applicability of the known facts and theories of wood seasoning to veneer drying and correlates drying-oven tests (veneer drying-rate curves) with the operation of industrial veneer driers. Practical aspects of veneer drying including checks,

buckling, wavy ends, casehardening and collapse are discussed in some detail.

2729. EASON, W. J. **Veneer splicing.** *J. For. Prod. Res. Soc.* 2 (4), 1952 (49–51). P.R.

Describes two types of veneer splicer used in an American plant: the conventional or pass-back type, either with two resistance rod heaters, or with one resistance rod and an R.F. unit, and continuous cross-feed electronic splicers. While the latter involve less manpower and less floor space, the former are more versatile.

2730. ELLISON, J. G. **British-made plywood and its possibilities.** In *Timber Progress and Desk Book for 1953*, Cleaver-Hume Press, London. 1952. pp. 82–96.

2731. NORTHCOTT, P. L. **The development of the glueline-cleavage test [with discussion].** *J. For. Prod. Res. Soc.* 2 (5), 1952 (216–24). P.R.

Also in *B.C. Lumberm.* 36 (12), 1952 (40–1, 64, 66, 124); 37 (1), 1953 (42–3, 98, 102, 108).

2732. HIRAI, S., and SHIMIZU, T. **[Studies on plywood. VII. Influence of the gripping equipment, loading velocity and depth of notch on the testing value of adhesive strength of plywood.]** *Wood Industry* [, *Japan*] 5, 1950 (85–6). From *abstr.* in *Rec. Res. Fac. Agric. Univ. Tokyo* No. 1, 1950/51 (1952), (74). [E.]

(1) There was no difference in value obtained from clamping equipment with and without side guides. (2) The value of the adhesive strength increases with rate of loading between 100 and 800 kg./min. but remains nearly constant within the range 200 to 600 kg./min. (3) The ultimate load obtained from a test piece in which the notch does not reach the glue line is about 20% higher than that in which the notch reaches the glue line accurately.

2733. COCHRANE, J. D. **Wood waste core materials for high pressure lamination.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (68–71). P.R.

Describes special properties required for wood-waste core materials applied (1) as a core to be incorporated within the laminated product in the pressing process, and (2) as a core to which the decorative veneer is attached by a gluing process.

2734. SEIDL, R. J. **Paper-honeycomb cores for structural sandwich panels.** *J. For. Prod. Res. Soc.* 2 (4), 1952 (13–22). 11 refs. P.R.

A brief account of some of the research conducted at Madison on sandwich building panels having cores made from corrugated paper of low resin content.

2735. SELBO, M. L. **Durability of glue joints in preservative-treated wood.** *Sth. Lumberm.* 185 (2321), 1952 (203–6).

Tests were made on laminated beams of different species (Red Oak, Hard Maple, Southern Yellow Pine and Douglas Fir) to which 7 commercial (creosote, pentachlorophenol, chromated $ZnCl_2$, Tanalith, Cu naphthenate, Celcure and Zn meta-arsenite) preservatives or a fire retardant had been applied by pressure process, and on untreated controls. Tabulated results show that: (1) high shear strength was generally maintained over the 6-year period of ageing in an unheated shed, by the different combinations of species and treatments; (2) after cycles of alternate soaking and drying, delamination was slight in both treated and untreated sections of Red Oak, Yellow Pine, and Douglas Fir, but was appreciable in Maple, although there was no consistent evidence that the preservative treatments had damaged the glue joints or increased the amount of delamination; (3) after exposure to weather for 6 years, delamination was considerable for Maple and slight for the other species. End checking was less in beams treated with oil- than with water-borne preservatives and least with creosoted beams. [Cf. *For. Abstr.* 13 (Nos. 670, 1570).]

2736. MCKEAN, H. B., BLUMENSTEIN, R. R., and FINNORN, W. F. **Laminating and steam-bending of treated and untreated Oak for ship timbers.** *Sth. Lumberm.* 185 (2321), 1952 (217–22).

In gluing tests, untreated White Oak, and Red Oak treated with pentachlorophenol or Wolman salts were conditioned to 12, 15 or 18% moisture content (m.c.) before gluing. Shear strength was satisfactory for both Red and White Oak at the different m.c. In bending tests, treated laminated Red Oak and untreated laminated White Oak gave bending results equal to those for solid White Oak. Results were satisfactory at both 12 and 18% m.c. White Oak laminates of different combinations of material containing 6·15 rings/in. with that containing up to 25 rings, produced bends of good quality. A slope of grain above 1 in. in 15 produced a large number of unsatisfactory bends and such material is not recommended where the ratio of piece thickness to curve radius is about 1 to 8, as in these tests. The direction of the glue line (parallel or perpendicular to the radius of the curve) in 'bending grade' Red Oak laminations made no difference to their bending qualities. Specimens containing scarf joints with a slope of 1 in. in 15 gave satisfactory bends. In delamination tests, 9 steam-bent specimens, selected at random but including variables of preservative treatment, species and presence of scarf joints, gave results well within the permissible maximum of delamination. Laminated steam-bent members were equal in strength to solid steam-bent ones, but both were inferior to specimens bent during laminating. Pentachlorophenol treatment had little or no effect on the toughness of Red Oak.

833. *Timber in Buildings and Engineering Structures (Manufacture and Use)*

2737. CORKHILL, T. **A concise building encyclopaedia illustrated.** Sir Isaac Pitman and Sons, Ltd., London. 3rd ed., 1952. pp. 366.

About 14,000 building terms are explained and 1200 illustrated.

833.1. Building Components and Fittings: General

2738. POOLE, J. R. M. **Recent developments in timber constructional techniques.** In *Timber Progress and Desk Book for 1953*, Cleaver-Hume Press, London. 1952. pp. 97–108.

Discusses some new techniques, mainly those employing glued laminated constructions.

2739. STAUDACHER, E. **Glued wood structures, their shapes, design and stresses involved.** *Transl. Commonw. sci. industr. Res. Organ. Aust.* No. 1861, 1952. pp. 12 + 3 plates. *Transl.* by K. Hirst from *SchrReihe Öst. Ges. Holzforsch.* No. 2, 1950 (94–113).

2740. RAPP, G. M. **Lightweight prestressed wood arches as a new type of roof construction.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (164–72). P.R.

Describes the 'Elastica Arch', consisting of elastic members of lumber and plywood, sprung and held in a flat arch by horizontal tie members which pre-stress the elastic members in bending.

2741. HEEBINK, B. G. **Veneer flooring.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (138–40). I.F.B.

Describes an experimental veneer flooring, tested at Madison, of $\frac{1}{8}$-in. rotary-cut Yellow Birch, laid in mastic directly on a concrete-slab floor in long 3-in. strips.

2742. ANDERSON, C. H. **Wood flooring developed to use with radiant heat.** *American Builder, Chicago* 71 (5), 1949 (106–7). P.R.

Describes tongued and grooved 5-ply hardwood flooring blocks 9-in. square and $\frac{1}{2}$-in. thick, bonded with waterproof glue impregnated with various chemicals to increase resistance against moisture, termites etc. The blocks are laid in mastic over the concrete slab, and maintain their shape when heated from beneath.

2743. MATHEWSON, J. S. **Radiant heated hardwood floors with coil between subfloor and finish floor.** *Repr.* from *Heating and Ventilating, New York* 49 (1), 1952 (72–3). 1 ref. P.R.

Presents results of tests on the behaviour of floor strips (Red Oak) nailed to sleepers supported on the subfloor, the heating (hot-water) coils being installed between the finish floor and the subfloor.

2744. SAKS, E. V. **Elm lends itself to artistic effects in plywood production.** *Wood, Chicago* 57 (7), 1952 (32–3, 34). P.R.

Discusses the possibility of Elm (also Ash and Oak) sliced veneers being used for making plywood flooring.

833.4. Special Uses in Agricultural Structures

2745. STRATTON, D. **Wooden sheds.** *Scot. Agric.* 32 (2), 1952 (90–2 + 4 photos). O.R.E.

Describes a wooden shed for farm use, designed by the Timber Development Association to be constructed from short lengths such as would be available from home-grown timber. The longest length used is 16 ft. × 6 in. × 2 in. The cost of a shed 60 ft. long (5 bays), 24 ft. wide and 14 ft. high to wall heads, closed except for 3 bays open in front, is about £85 per bay inclusive of a corrugated asbestos roof.

2746. **A grain silo in plywood.** *Wood* 17 (12), 1952 (480–1).

Describes and illustrates with sections and plans a silo of 20-tons capacity, designed by the Timber Development Association. It is built of 3 rings, each 4 ft. 6 in. deep, made in quadrants of $\frac{3}{8}$-in. Sapele plywood, bonded with waterproof phenolic resin. [Cf. *For. Abstr.* 12 (No. 2275).]

2747. POOLE, J. R. M. **An experimental plywood grain silo.** *Quart. Rev. Timb. Developm. Ass.* 3 (8), 1953 (1–4).

A fuller account of the silo already described. [Cf. preceding abstract.]

833.8. Wood in Hydraulic, River and Marine Uses

See Nos. 2655, 2750.

834. *Shingles. Cooperage. Packing Containers*

See also No. 2775.

2748. C., D. **Un container démontable combiné avec palette. [A folding wooden container-pallet combination.]** *Rev. Bois Appl.* 8 (1), 1953 (46). [F.]

An illustrated description of a combination of a double pallet with a neatly made container, the upper face of the pallet serving as the bottom of the latter, which is detachable and can be folded. The pallet is the standard 120 × 80 cm., the container being 120 × 73 × 75·5 cm. (internal), with a capacity of 0·661 cu.m. The over-all dimensions of the folded pallet-case are 162 × 25·4 × 83·6 cm. and its weight is 84 (Pine), 65 (Fir), or 58 kg. (Poplar).

835. *Industrial and Domestic (Utility) Woodware. Toys and Models. Sports and Recreational Goods. Musical, Scientific and Mathematical Instruments. Surgical Uses etc.*

See No. 2676.

836. *Furniture and Cabinet-Making. Carving. Marquetry. Wooden Ornaments*

2749. HEAL, J. C. **The development of modern furniture design in Britain.** In *Timber Progress and Desk Book for 1953*, Cleaver-Hume Press, London. 1952. pp. 109–18.

838. *Vehicles (including Ships, Boats, Aircraft)*

See also No. 2736.

2750. WOODS, R. P. **Timbers for marine construction.** *Quart. Rev. Timb. Developm. Ass.* 3 (8), 1953 (7, 9).

Lists a number of species from Australia, India, West Africa and S. America suitable for marine construction but little used for the purpose in Great Britain, and gives some of the dimensions specified for different uses.

2751. WOODS, R. P. **Timber for ships' decking.** *Timb. Inform. Timb. Developm. Ass., Lond.* No. 42, [1952?]. pp. 2.

Discusses the results of service tests on *Paratecoma peroba, Gossweilerodendron balsamiferum, G. benthamianus, Distemonanthus benthamianus, Afrormosia* sp. *Khaya* sp., *Tectona grandis* and *Chlorophora excelsa* laid down as decking between 1947 and 1950. All were suitable to a greater or less degree. [Cf. *For. Abstr.* 12 (Nos. 1433, 2216).]

2752. Huarte Mendioca, P. Necesidades de madera aeronáutica para la resolución del problema de su abastecimiento dentro del marco de la economía nacional. [**Requirements in aircraft timber in relation to problems of supply within the framework of the national economy.**] II Congreso Nacional de Ingeniería, Instituto de Ingenieros Civiles de España, Madrid 1950, Vol. IV, 1951 (479–87). [Span.]

Lists and discusses the physical and mechanical properties of timbers used in Spain for aircraft construction, and considers the problem of finding suitable native species to replace imported ones. The most promising is *Pinus sylvestris*, and the properties of this and other native timbers are reviewed and compared with those of Sitka Spruce.

839.8. *Industrial Waste Wood and its Uses*

See also Nos. 2287, 2696, 2733, 2865, 2872–4, 2877–8.

2753. Saeman, J. F. **Status of chemical utilization of wood waste [in the U.S.A.].** *J. For. Prod. Res. Soc.* 2 (5), 1952 (50–5). 21 refs. P.R.

2754. Siimes, F. Abfallholz der mechanischen Holzverarbeitung in Finnland. [**Wood waste from mechanical conversion in Finland.**] *Holz Roh- u. Werkstoff* 10 (10), 1952 (379–80). [G.g.] P.R.

With the Finnish timber industry beginning to pay more attention to this question, the following average figures are given for 1951: (1) in the sawmill industry slabs and edgings form 18%, butt and top offcuts 6%, and sawdust 14% of the total consumption of ca. 10,000,000 cu.m.; (2) in the Birch veneer industry 62% of the annual figure of 250,000 cu.m. is wood waste; (3) of the 250,000 cu.m. of Birch furniture timber, 68% is waste; (4) in the bobbin industry, 93%; (5) the total quantity of softwood waste in Finland is 3,790,000 cu.m.

2755. Stanisławski, A. Brykietowanie trocin bez użycia środków wiążących. Część I. Nowa metoda—Próby i badania. [**Briquetting of sawdust without binders. Part I. A new method—Tests and investigations.**] *Prace Inst. Bad. Leśn.* No. 79, 1952. pp. 56. 7 refs. [Pol.russ.]

A discussion of 6 foreign (2 Soviet, 1 Finnish, 1 German, 1 Swedish, and 1 American) methods of binderless briquetting of sawdust is followed by a detailed description of the design, construction, and performance of a Polish briquetting apparatus the prototype of which was built in December 1949. The pressure used is 70 kg./sq. cm., the temperature from 250° C. (light-coloured briquettes) up to 400° (dark briquettes). The method is claimed to be applicable for briquetting raw (unscreened) hardwood or softwood sawdust, turnings, conifer needles, and oil-industry waste such as sunflower seed husks. The properties of the sawdust briquettes obtained [the first figure refers to light, and the second to dark briquettes] were: density when absolutely dry—0·855, 0·700 g./c.c.; moisture content of manufactured product—8·0, 5·5%; absorption of water vapour by absolutely dry specimens (relative humidity 72%, temperature 20°)—9·5, 7·5%. Dark briquettes do not disintegrate in water for 12 months. The briquettes can be used advantageously for dry distillation, behaving like solid wood. Dark briquettes are suitable fuel for gas-producers.

2756. Mésanguy, M., Kraffe de Laubarède, L., and Frick, M. Composition pour la préparation d'agglomérés de sciure combustibles et produit obtenu. [**Binder for making fuel briquettes from sawdust.**] *French Patent* No. 980,339, May 10, 1951. pp. 4. [F.] P.O.

The binder comprises: a vegetable mucilage, soda, colloidal clay, and trioxymethylene (or ortho- or para-oxybenzoic acid).

2757. Blakey, G. G. **A new or improved process for the production of fuel from woodwaste.** *Brit. Patent* No. 656,832, Sept. 5, 1951. pp. 2. P.O.

Wood waste, or other powdered vegetable matter, is impregnated with e.g. water-gas tar, after which acid chemical or chemicals are added (e.g. HCl or H_2SO_4) and the mass finally subjected to a high pressure and temperature until it sets.

2758. Wolfe, L. P., Jr., and Dunn, S. **Sawdust composts in soil improvement. I. Studies on aeration, acid hydrolysis, manure, and waste materials as composting aids.** *Plant & Soil* 4 (3), 1953 (223–34). 3 refs.

2759. Macdonald, W. A., and Dunn, S. **Sawdust composts in soil improvement. II. Pot culture studies with compost mixtures of sawdust and manure, steam treated composts, and miscellaneous mixtures.** *Plant & Soil* 4 (3), 1953 (235–47). 4 refs.

84. PRESERVATION AND OTHER TREATMENTS TO IMPROVE THE PROPERTIES OF WOOD. DAMAGE BY BIOLOGICAL AGENCIES AND ITS CONTROL. SEASONING. TIMBERYARD PRACTICE

841. *Wood Preservation*

See also Nos. 2621, 2709–10, 2735, 2802, 2804, 2806–7, 2820–1, 2828–30, 2847.

2760. Purushotam, A., Pande, J. N., and Jadhave, Y. G. **Wood preservation in India.** *Indian For.* 78 (12), 1952 (627–34); 79 (1; 2), 1953 (49–65; 92–107 + 28 photos + 9 dgms. + 9 tbls. + 1 map). 28 refs.

In addition to an historical account, description of current methods and discussion of preservatives, data are given on natural durability of the principal Indian timbers, derived from graveyard tests.

2761. Bennett, R. G. **Service records [with discussion].** *Rec. [2nd] Conv. Brit. Wood Pres. Ass.* 1952 (3–8, 14–27).

Summarizes the recommendations of the Service Records Sub-Committee of the British Wood Preserving Association on the form of records to be kept and on co-ordination of information and co-operation between users and suppliers. [Cf. *For. Abstr.* 13 (No. 3413).]

2762. Hunt, G. M. **Notes on evaluating wood preservatives [with discussion].** *Rec. [2nd] Conv. Brit. Wood Pres. Ass.* 1952 (9–27).

Discusses different types of laboratory and field tests.

2763. INOUYE, Y., and NISHIMOTO, K. **[Studies on wood preservatives VI. Improvement of testing methods for preservatives.]** *Wood Res., Kyoto* No. 7, 1951 (45–53). 12 refs. [Jap.e.]

[Cf. *For. Abstr.* 14 (No. 1638).] In order to accelerate standard tests thin pieces of Kuromatsu [*Pinus thunbergii*], Hinoki [*Chamaecyparis obtusa*], Kuri [*Castanea crenata*] and Buna [*Fagus crenata*] were exposed to attack by Hiirotake [*Polystictus sanguineus*] for a month; results were inconclusive because the samples were not suitable for the measurement of impact strength. In the second experiment 10 × 0·8 × 0·8 cm. sticks of Pine, Chestnut, and Beech were exposed to attack for 1½ months; measurements of impact strength were successful. A preservative from the Wood Research Institute proved to be superior to coal-tars generally used. It is believed that the new method (using sticks) greatly reduces the time needed to test preservatives. *From authors' summary.*

2764. SEDZIAK, H. P. **The evaluation of two modern wood preservatives.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (260–8). 4 refs. P.R.

Pentachlorophenol and Cu naphthenate were subjected to a variety of accelerated laboratory and service tests in an effort to determine their wood-preserving value and other properties. These investigations were also used to develop laboratory techniques for the evaluation of wood preservatives. The report includes the writer's appraisal of the possibilities and limitations of present-day methods of evaluation. *Author's summary.*

2765. RIPLEY-DUGGAN, B. A. **Retention by wood of copper and zinc from aqueous solutions of their salts.** *J. appl. Chem.* 2 (10), 1952 (593–600). 10 refs. P.R.

The retention of metal is defined as the quantity bound by a given weight of wood, after washing out unchanged salt. The retention is shown to result from ion-exchange with H ions and metal ions attached to hydroxyl and carboxyl groups occurring in natural constituents of wood. The effect of such variable factors as the concentration of treating solution, H-ion concentration, species of wood, temperature, and nature of anion, have been studied. The use of Cu and Zn acetates results in larger retention of those metals. For this reason Cu acetate is suggested as a wood preservative. *Author's summary.*

2766. THEDEN, G. Ergebnisse der Auswaschbarkeitsprüfung von Holzschutzmitteln. **[Results of leachability tests on wood preservatives.]** *Elektrizitätswirtschaft, Göttingen* 50 (3), 1951 (59–62). [G.] L.S.

Defines the leachability number (l.n.) as determined according to the biological standard procedure DIN 52,176, sheet 2, in terms of the ratio of the preservative loading required to preserve the wood after leaching to efficacious preservative loading when not subjected to leaching. The l.n. of coal-tar oil, determined with 5 fungus species, is ca. 1, which means that the leaching does not lower the efficiency of the preservative. Other oily preservatives ("Carbolineum," brown-coal tar oil, preservatives based on chlorinated naphthalene) have also a relatively low l.n., and so has $HgCl_2$. The U and UA salts (mixtures of NaF, $K_2Cr_2O_7$, with or without an arsenate, usually with an addition of dinitrophenol or a similar compound) have l.n.'s ranging from 10 to 30. Zn salts, As compounds, dichromates, and fluorides and fluosilicates have very high l.n.'s.

2767. MCNEIL, D. **Some notes on the chemical composition of coal-tar creosote [with discussion].** *Rec. [2nd] Conv. Brit. Wood Pres. Ass.* 1952 (147–76). 6 refs. [Coal Tar Research Association.]

2768. LIESE, W. Über den Einfluss physikalischer Eigenschaften öliger Schutzmittel auf die Eindringung in Holz. **[Effect of the physical properties of oily preservatives on their penetration into wood.]** *Bitumen, Teere, Asphalte, Peche und Verwandte Stoffe, Heidelberg* 2 (11), 1951 (276–9). 14 refs. [G.g.] D.S.I.R.

No direct relationship could be found between the viscosity or surface tension of oily preservatives and either the time of disappearance of a drop placed on wood, or the surface spread of the preservative after 30 sec., 30 min., and 24 hr. On the other hand, the rate of upward penetration in the axial direction is obviously related to viscosity, increasing as the viscosity becomes less. In agreement with this finding, the penetration rate of an oily preservative increases with temperature. No clear relationship could be found between the depth of penetration on the one hand, and the viscosity, surface tension, and specific gravity of the oil on the other. It appears that chemical factors play a decisive role in penetration.

2769. SANDERMANN, W., and JONAS, G.-Z. Über die Imprägnierung von Hölzern mit öligen Schutzmitteln, unter besonderer Berücksichtigung der Fichte. **[Impregnation of woods, in particular of Spruce, with oily preservatives.]** *Holz Roh- u. Werkstoff* 10 (8), 1952 (305–11). 23 refs. [G.g.] P.R.

The penetration of oily preservatives into variously pre-treated Spruce-wood samples was determined by means of a specially designed apparatus; it was found that the substance causing the gluing of pits belongs to the hemicellulose or pectin class. It is stressed that polar compounds with a carbophilic 'tail' can coat the hygrophilic surfaces of wood membranes with a monomolecular carbophilic layer. This reaction facilitates the penetration of oily preservatives. Describes a modified vapour-drying method for the seasoning and impregnation of green Spruce, using toluene or xylene as auxiliary liquids, which allows deeper penetration of tar oil.

2770. CHRZANOWSKI, R. H. (to Osmose Wood Preserving Co.). **Thixotropic gel for preserving wood.** *U.S. Patent* No. 2,599,373, June 3, 1952. pp. 6. P.O.

A non-aqueous gel structure composed of a liquid hydrocarbon, at least a portion of which is volatile, and a gel-forming agent (saturated and unsaturated fatty acids with 8–18 C atoms, or their metal salts), a

stable water-soluble fungicide preservative being distributed as finely divided particles in the gel, which is mixed with a solid inert filler (e.g. asbestos).

2771. PICKREN, J. H. (to American Celcure Wood Preserving Corp.). **Wood treating preparations.** *U.S. Patent* No. 2,557,062, June 19, 1951. pp. 4. P.O.

A preparation comprising the reaction products of 1·25–4% of $Cu(NO_3)_2$ or $Zn(NO_3)_2$, 0·3–4% CrO_3, and an excess (1–2·5%) of phenolsulphonic acid, in water.

2772. UNITED CHEMICAL AND METALLURGICAL WORKS NATIONAL CORPORATION. **Improvements relating to the impregnation of wood with arsenic preparations.** *Brit. Patent* No. 670,509, April 23, 1952. pp. 4. P.O.

Wood is pressure-impregnated with a solution containing not less than 1% of alkaline-earth metal thioarsenite $(MeS)_x(As_2S_3)_y$, where x and y are small positive integers, and Me can be Ca, Sr, Ba, or Mg.

2773. VESTERINEN, K. J. Menetelmä ja suojaaine puun ja muiden orgaanisten aineiden suojelemiseksi lahoamiselta ja muilta eliöiden aiheuttamilta tuhoilta. **[Method and preservatives for protecting wood and other organic materials against rot and other damage caused by organisms.]** *Finnish Patent* No. 25,287, March 7, 1952. pp. 2. [Finn.sw.] P.O.

A wood preservative containing soluble silicofluorides with the addition of chromates or dichromates of alkali metals, and As_2O_5 or its soluble salts.

2774. **Preservation of timber with 'Tanalith' wood preservative.** *Mining Bulletin, King's College, Durham University* 5 (4), [n.d.] pp. 11. D.S.I.R.

Describes the history of the development of 'Wolman' salts, and various toxicity, fixation, and service tests with them. Summarizes service records relating to the use of 'Tanalized' pitprops in the U.K., outlines the advantages and methods of treatment and points out further applications in mines. [Cf. *For. Abstr.* 14 (No. 780).]

2775. HORGAN, E. D. **Wood preservative.** *Mod. Packaging* 25 (2), 1951 (116–20). 3 refs. P.O.

Presents photographs and tables relating to various tests on the effect of the fungicide 'Cellu-san' (a composition of Zn petroleum sulphonate) on tensile strength, water repellency, and control of fungal growth. Yellow Birch veneer strips and Yellow Pine sapwood blocks were used, the tests being conducted with both unleached and leached specimens (leaching with water for 24 hr. at the rate of 8 litres/hr. Tensile strength was tested by the Hopkins-Coldwell technique [cf. *For. Abstr.* 7 (No. 1321)]; decay resistance by the Leutritz method [cf. *For. Abstr.* 9 (No. 2272)]. Dipping in 5 or 10% solution of Cellu-san in mineral spirits preserved nearly 100% of the original tensile strength of specimens buried in moist soil for 28 days, while controls retained only 7–9%. No fungal growth could be observed on treated blocks (whether unleached, leached, or roof weathered), while controls developed moderate or heavy growth after 1–3 weeks. Water absorption after 4-hours' immersion was 9–10% for treated and 35–40% for untreated specimens. Tests of boxes made of the treated and untreated wood showed that the former held nails and resisted rough handling much more effectively. Cellu-san was fed to rabbits without ill effects. It is claimed to be particularly suited for the treatment of pallets and wooden containers used in the handling or storing of odour- and mildew-sensitive materials.

2776. KNIGHT, F. J. **The painting of oil-preserved wood.** *Wood* 18(2), 1953 (56–8).

Experiments at the laboratories of the Taylor Colquitt Co., Spartanburg, S. Carolina, showed that solvents responsible for difficulty in painting over oily-type preservatives, could be removed from the wood after impregnation. In tests, solutions of 9·5% Cu naphthenate or 5–10% pentachlorophenol were used as impregnating agents in various solvents, including trichlorethylene, toluol, naphtha and perchloroethylene. A modified form of vapour drying [cf. *For. Abstr.* 12 (No. 1409)] was used; the equipment is shown in illustrations. The wood was given alternate vapour and vacuum treatments, each lasting 1 hr., until all the solvent had been removed, and was then reconditioned. Preservative and solvent amounts recovered were 20–25 lb. Cu naphthenate and 500–900 lb. solvent from each 1000 bd. ft. of timber treated. Painting tests gave much better results on wood treated by the solvent recovery than by the normal method. Analysis showed that Cu naphthenate concentrations by the new method were lower at the outer quarter-inch of the wood than by the normal method but were still adequate, and were as high as by the normal method in the centre of the boards. Tests on the recovered solvent showed that the vapour treatments had not lowered its quality. Savings on chemicals more than cover the cost of the process, which makes it possible to dry, impregnate and treat green timber in 24 hr., leaving a final moisture content of 5–8%.

2777. ANCIAUX, F. **An improved composition for the preservation of timber and the like and for the waterproofing of walls.** *Brit. Patent* No. 670,258, April 16, 1952. pp. 2. P.O.

The composition, applied by dipping, consists of an intimate mixture of boiled linseed oil, rosin, gum mastic, and turpentine; claimed to be effective against termites and other wood-destroying insects.

2778. ROTHWELL, W. **[Preservation] plant design and layout—pressure treatment [with discussion].** *Rec. [2nd] Conv. Brit. Wood Pres. Ass.* 1952 (120–39).

2779. KAUFERT, F. H., NEETZEL, J. R., HOSSFELD, R. L., and REES, L. W. **A small vacuum treating plant.** *Minn. For. Notes* No. 12, 1952. pp. 2.

Describes, with diagram, a plant (taking 1000 bd. ft. lumber per charge) developed at the University of Minnesota School of Forestry, to fill the gap between large commercial treating plants and the dip or cold-soak processes. Cost of installation should not exceed $6000 at 1952 prices.

2780. EGUND, K. F. Anordninger til overfladeimprægnering av myndre emner ved dypning. **[Equipment for surface impregnation of small articles by dipping.]** *Cirk. Træindustr. Forskn Udv.* No. 1, 1952. pp. 4. [Dan.] P.R.

The apparatus, designed primarily for treating steamed Beech, consists of a trough for the preservative with 2 guide rails, and 2 bearing blocks carrying a horizontal axle; this carries 2 sets of arms, forming 4 compartments. These are successively charged with sawn material, to be dipped as the wheel revolves, and when a compartment reaches the fourth position the wood falls out on the guide rails and slides down to a position where surplus preservative drips off into a container. The apparatus, which is very simple and cheap to make, is illustrated with constructional diagrams.

2781. HARROW, K. M. **Impregnation of *Pinus radiata* D. Don building timber with boric acid by diffusion.** *N.Z. J. Sci. Technol.* 33*B* (6), 1952 (471–82). 2 refs. P.R.

It is shown by experiment that freshly sawn *P. radiata* timber up to 3 in. thick can be impregnated with H_3BO_3 by the diffusion process—a process consisting in immersion in the solution followed by a storage period under restricted drying conditions. Loading (the amount of H_3BO_3 diffusing into wood during immersion) is directly proportional to solution concentration and to the square root of immersion time, and inversely proportional to thickness of timber. Given values for any three unknowns, the fourth may be calculated by substituting in the equation:

$$\frac{\text{Solution conc. (\%)} \times \sqrt{\text{time (hr.)}}}{\text{loading (\%)} \times \text{thickness (in.)}} = k\ (= 7)$$

The distribution ratio obtained in boards given the same storage period is independent of mean loading, so that, within limits, a given core loading is obtained more rapidly with a high mean loading than with a low mean loading. Three weeks' storage under restricted drying conditions is needed to obtain a high distribution ratio (0·7 to 0·8) in 1-in. boards, and eight weeks for 2-in. scantlings. *From author's summary.*

2782. HARROW, K. M. **Impregnation of Tawa (*Beilschmiedia tawa* Benth. and Hook. f.) with boric acid diffusion. III. Sampling of timber treated with boric acid.** *N.Z. J. Sci. Technol.* 33*B* (5), 1952 (385–92). 7 refs. P.R.

The variation of the amount of H_3BO_3 in 1-in. Tawa boards impregnated commercially by the diffusion process was determined. It was found that low core-loading %s of H_3BO_3 were obtained in quarter-sawn boards. A relationship between 'wood angle' [defined by the author as the angle formed on the tangent to the annual rings passing through the core sample and the broad surface of the board] and core loading was calculated from these data. Examination of parcels of Tawa from various mills showed that the proportion of boards with wood angles greater than 50° is unlikely to be more than 20%. For building timbers it is proposed that no more than 10% of boards in a charge should have core loadings below 0·2% of H_3BO_3. Sampling systems for commercial treatments are discussed and a selective sampling method recommended. *Author's summary.*

2783. SPILLER, D. **A note on the toxicity of boric acid to larvae of the two-tooth longhorn *Ambeodontus tristis* F.** *N.Z. J. Sci. Technol.* 33*B* (6), 1952 (493–4). 4 refs. P.R.

Results of a single determination show that loadings as low as 0·092% give a complete kill, and that at lower loadings larval weights decrease linearly as the loading increases. Zero weight (kill?) was extrapolated for a loading value of 0·066% of H_3BO_3.

2784. TONNEMACHER, F. Probetränkversuche mit verschiedenen Imprägniermitteln. **[Impregnation trials with different impregnating agents.]** *Elektrizitätswirtschaft, Göttingen* 50 (3), 1951 (56–8). [G.g.] L.S.

Presents the results of tests on the radial penetration of some wood preservatives into Spruce poles. The following preservatives and impregnation methods were used: (1) pressure method—coal-tar oil, and Cr/As mixture, and (2) open-tank method—Cr/As mixture, and $HgCl_2$. With the exception of coal-tar oil, it was found that the depth of penetration, amount of preservative absorbed, and % of the sectional area impregnated were roughly twice as great in poles with wide annual rings as in those with narrow ones. The maximum depth of penetration (27·9 mm.) occurred with pressure treatment of wide-ringed wood with Cr/As mixture; least penetration (1·4 mm.) with open-tank impregnation of narrow-ringed wood with $HgCl_2$.

2785. SCHULZE, B. Intensive Schutzbehandlung stehender Masten aus Kiefernholz durch Trogtränkung nach vorangehender Erwärmung durch hochfrequenten Strom. **[Intensive preservative treatment of standing Pine poles by open-tank impregnation following R.F. heating.]** *Elektrizitätswirtschaft, Göttingen* 50 (3), 1951 (66–8). [G.] L.S.

An illustrated description of laboratory and field tests on the feasibility of re-impregnating the danger zones (around soil level) of standing Pine poles. For this purpose, a hole ca. 50 cm. deep was dug round each pole, 2 Al electrodes ca. 80 cm. long were placed in it on two sides of the pole and a current of 10,000 volts and 20 megacycles/sec. fed to the electrodes from a 1·5 KW. (output) generator. After ca. 77 min. the temperature 4 cm. below the pole surface attained 105° C., which is considered sufficient to kill all fungi and larvae. The bottom of the hole was then covered with plaster of Paris into which, while setting, a tubular jacket 80 cm. long and 24 cm. in diameter was forced from above, the plaster layer thus forming its bottom. A preservative is then poured into it. Tests have shown that, in an 18–20 cm. pole with heartwood of 15 cm. diam., the penetration after 6 days was nearly complete at soil level, decreasing upwards and downwards, while after 10 weeks a complete penetration was observed from − 50 to + 30 cm. The preservative used was a 20% solution of 'Osmol WB'. In order to prevent leaching, the reimpregnated part of the pole was painted with a bituminous preparation.

2786. **Preservation of mining timber.** *Information Bulletin, National Coal Board* No. 70, 1952. pp. 7. N.C.B.

General information. Water-soluble preservatives (particularly Wolman salts and Celcure) should be preferred to creosote, because of the latter's combustibility. Two appendices give the results of some service tests.

2787. TAMBLYN, N. **Problems of rail sleeper preservation in Australia.** *Rec. [2nd] Conv. Brit. Wood Pres. Ass.* 1952 (177–83).

2788. CARR, D. R. **Preservation of timber for light building construction [in New Zealand].** *Rec. [2nd] Conv. Brit. Wood Pres. Ass.* 1952 (68–81). 12 refs.

2789. LINDY, K. J. **The need for timber preservation in present-day building [with discussion].** *Rec. [2nd] Conv. Brit. Wood Pres. Ass.* 1952 (58–67, 81–90).

Discusses the effect of the increased use of softwood, the shorter rotation of softwood crops and its influence on wood structure, changed constructional methods and the increase in sources of infection as a result of the war, on the incidence of insect and fungus damage.

842. *Treatments to Improve the Resistance of Wood to Physical and Chemical Agencies other than Fire*

See also No. 2742.

2790. STAMM, A. J., and TARKOW, H. **Method of stabilizing wood.** *U.S. Patent* No. 2,572,070, Oct. 23, 1951. pp. 6 + 1 dgm. P.O.

Wood is air-dried to a moisture content of 2–4%, treated with water-free vapour of a ketal- or acetal-group-forming reagent (formaldehyde, acetaldehyde, glyoxal, benzaldehyde, acetone), and contacted with vapour of a mineral acid (e.g. HCl).

2791. LUNDSTROM, C. B. **Method of impregnating wood with chemical solutions.** *U.S. Patent* No. 2,567,292, Sept. 11, 1951. pp. 4 + 5 dgms. P.O.

A method of locally densifying the surface of a wooden article by subjecting that surface of the wooden blank to steaming followed by dipping in a cold solution (e.g. 216 parts by weight of water, 8 parts of NaOH, 52 parts of $Na_2B_4O_7$, 384 parts of dimethylolurea, and 340 parts of urea), and finally subjecting the blank to heat and moulding pressure applied to the same surface.

2792. WIRTH, M. R. Verfahren zum Veredeln von Holz und daraus hergestellten Gegenständen. **[Method of improving wood and wooden articles.]** *Swiss Patent* No. 276,488, Oct. 1, 1951. pp. 4. [G.] P.O.

Wood is impregnated with aqueous solutions of first-stage condensates of synthetic resins, and condensation takes place on or in the fibres. The resins used are aldehyde, combined with dicyanamide and at least one other substance capable of reacting with aldehyde.

2793. OFFICE NATIONAL D'ÉTUDES ET DE RECHERCHES AÉRONAUTIQUES (O.N.E.R.A.). **Improved process for treating wood.** *Brit. Patent* No. 676,871, Aug. 6, 1952. pp. 3. P.O.

Wood is first treated with an NaClO solution to remove substantially all lignin in hardwoods, or to remove lignin and destroy the diaphragms of the bordered pits of tracheids in softwoods; then the voids are filled completely with a material such as synthetic thermo-setting or thermoplastic resin.

2794. PIENING, W. Verfahren zur Imprägnierung von Holz, insbesondere von Buchenholz. **[Method of impregnating wood, in particular Beech wood.]** *German Patent* No. 824,853, Dec. 13, 1951. pp. 2. [G.] P.O.

Beech wood is impregnated with paraffin wax containing waste products of the oil industry that are solid at normal temperatures (say, 10–20° C.), but become thin liquids at the temperatures of the impregnation process.

2795. PEW, D. D. (to Stopall Waterproofing Manufacturers Inc.). **Wood waterproofing composition.** *U.S. Patent* No. 2,549,127, April 17, 1951. pp. 4. P.O.

A composition containing 4–10% of chlorinated polyphenyls (commercial 'Aroclor'), 3–10% of hydrogenated methyl abietate (commercial 'Hercolyn'), 3–6% of Me phenyl polysiloxane, sometimes additions of other substances such as dipentene, pentachlorophenol, or zinc octoate, and solvents (alkylated benzenes mixed with medium-boiling aliphatic solvents).

2796. POWER, G. E. **New developments in plastic wood laminates.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (92–5). P.R.

'Stratawood', which is a decorative variety of compreg, has been widely accepted for use in such items as cutlery handles, brush backs, coat buttons, fountain-pen desk sets. More recently, 'Gaugewood', a cross-banded variety of compreg, available in large sheet sizes, has been introduced for industrial use as die stock, foundry patterns etc. *From author's summary.*

2797. HIRAI, S. **[Studies on laminated woods.]** *Bull. Tokyo Univ. For.* No. 41, 1951 (85–181). 106 refs. [Jap.e.]

Studies were made on ordinary and compregnated veneer assemblies. (1) *Species:* Those most commonly used are *Chamaecyparis obtusa*, *Pinus thunbergii*, *P. densi-thunbergii*, *Picea jezoensis*, and *Cryptomeria japonica*; the first three make better and the last two less good compregnated plywoods. Pressures range from 5·5 to 80 kg./sq. cm. Compregnated plywood (*a*) of *Betula ermani* var. *subcordata* is inferior in some respects to that of *B. maximowicziana*, which is commonly used, but will serve for most of the same purposes; (*b*) of *B. platyphylla* and of *B. costata* is much inferior to that of *B. maximowicziana*; (*c*) of *Machilus thunbergii* is of very poor quality and cannot be used where reasonable strength is required. (2) *Adhesives:* Of three kinds of phenol-formaldehyde used in compregnating plies, that from which the water had been removed gave better results than a water-containing resin or a neutralized resin with the water removed. When a phenol-formaldehyde resin containing melamine was used the temperature could be reduced from 130–140° C. to 100°, but the product was inferior in some respects. Phenol-formaldehyde resin containing vinyl-formal is not suitable for

compregnated plywoods. Tego film can be used for normal plywood. Normal plywood with moderately good properties apart from compressive strength can be made from plies immersed in protein solutions of casein, soybean or peanut at pressures of 40 kg./sq. cm. and temperatures of 120–130°. (3) *Assembly:* Plywoods were prepared from *B. maximowicziana* and *Fagus crenata* with the following grain arrangement: (*a*) normal plywood with grain of alternate plies at right angles; (*b*) compregnated plywood, ditto; (*c*) compregnated assemblies, grain of every sixth ply at right angles; (*d*) compregnated assemblies, grain of every eleventh ply at right angles; (*e*) compregnated assemblies, grain of alternate plies crossing at 45°; (*f*) compregnated assemblies, grain of alternate plies crossing at 30°. The physical and mechanical properties of the products are tabulated. (4) *Large-dimension assemblies.* Normal and compregnated assemblies as in (3), up to 2 m. long, were prepared from softwood veneers and tests done on both small samples and the full-scale assemblies. Tensile strength values of the latter were 50–91% those of the small samples. Tensile strength of assemblies of *Chamaecyparis obtusa* and *Pinus thunbergii* manufactured at a pressure of 50 kg./sq. cm. is equal to that of *Betula maximowicziana* and superior to that of *Fagus crenata* manufactured at 170 kg./sq. cm. If in making lengths over 2 m., the veneers are scarf jointed and the joints are scattered, their quality is not less than that of joint-free assemblies. (5) *Special treatments:* (*a*) Plies were treated with phenol-formaldehyde resin, air-dried, compressed between rollers, assembled and clamped with head blocks and bolts, and the whole then heated to 130–145°. The quality of the product was intermediate between normal and compregnated assemblies, with a rather low adhesive strength, but proved suitable for general use. (*b*) Properties of a compregnated assembly of plies mainly of summerwood of *Cryptomeria japonica* were good except for shearing and adhesive strength; such cannot, however, be produced on a large scale.

2798. Goto, T., and Kadita, S. **[Studies on the mechanical and physical properties of high-density laminated wood bonded with low-temperature cresol-formaldehyde resin adhesive.]** *Wood Res., Kyoto* No. 7, 1951 (54–69). 27 refs. [Jap.e.]

The laminate was composed of 24, 48, or 72 veneers of Birch (*Betula maximowicziana*), with an average thickness of 0·72 mm., an area of 20 × 20 cm. and a moisture content of 8%. The period of impregnation was 20 hr. All veneers were assembled with the same grain direction. The adhesive was cured at 140° C., and 150 kg./sq. cm. pressure for 10, 20 and 30 min. for the 24-, 48- or 72-veneer assemblies respectively. Results are given in tables and graphs with English legends. The mechanical and physical properties of the assemblies were rather below those of assemblies bonded with phenol-formaldehyde. Best results were obtained when the veneers were dried before pressing, to give 4–6% moisture content. Resistance to boiling acetone and to acid was generally good. Considerable differences occurred in the temperature at the hot plate and at the centre of the assemblies during pressing and in the time taken to raise the centre layer of the different assemblies to a given temperature. The penetration of adhesives into veneer varied with timber species, the nature and concentration of the solvent, the nature of the adhesive, the moisture content of the veneer and the method of impregnation, but resin content normally reached a maximum in 1 hr. The properties of the assemblies were acceptable by Japanese Export Standards.

2799. **Machining improved-wood.** *Aircraft Production, London* 14 (166), 1952 (275–7). L.S.

Some notes on the sawing, surfacing, thicknessing, spindle moulding, turning, overhead recessing, and finishing of improved wood, illustrated by diagrams.

843. *Fireproofing and Fire Resistance*

2800. Clarke, S. H. **The value of fire-retardant treatments [with discussion].** *Rec. [2nd] Conv. Brit. Wood Pres. Ass.* 1952 (91–112). 15 refs. [Fire Research Station, Department of Scientific and Industrial Research.]

Describes flame-spread and fire-resistance tests, and discusses literature on the behaviour of treated and untreated timbers in tests and in actual fires, concluding that treatment is valuable in delaying development in the early stages of fires but has little effect once a fire is fully developed.

2801. Rakos, J. J. **Fireproofing compositions.** *U.S. Patent* No. 2,593,400, April 22, 1952. pp. 4. P.O.

A composition possessing anti-flaking and anti-peeling qualities contains 48% by weight Na silicate, 20% Na_3PO_4, 20% lithopone, 10% finally divided SiO_2, and 1% each of formaldehyde and NaOH.

2802. Bescher, R. H. (to Koppers Company, Inc.). **Wood preservation.** *U.S. Patent* No. 2,545,222, March 13, 1951. pp. 6 + 2 gphs. P.O.

Wood is made fire- and fungus-resistant by pressure impregnation with a mixture of 80% chromated $ZnCl_2$, 10% H_3BO_3 and 10% $(NH_4)_2SO_4$ at a loading of 1–3 lb./cu. ft., the surface being then sealed with a fireproof and waterproof coating (e.g. phenol-formaldehyde resin with chlorinated paraffin wax).

2803. Eisner, H. S. **Fire-retardant treatment of mine timber.** *Research Report, Safety in Mines Research Establishment* [, *Sheffield*] No. 35, 1951. pp. 37. 38 refs. Price 2*s*.

A review of the existing state of knowledge.

844. *Attack by Plant Organisms*

2804. Findlay, W. P. K. **Dry rot and other timber troubles.** Hutchinson's Scientific and Technical Publications, London. 1953. pp. 267. 12 refs. 49 photos. Price £1. 5*s*.

Contains chapters on: (1) The nature of wood; (2) causes of deterioration in wood; (3) fungal decay; (4) discolorations, stains and blemishes; (5) destruction of wood by insects; (6) diseases of standing trees; (7) care of timber after felling and conversion; (8) wood preservatives and their uses; (9) decay of timber in buildings; (10) protection of timber in farm

and garden; (11) decay in ships, boats and marine works; and (12) decay in vehicles, aircraft, mining timbers, cooling towers, packing-cases, fibreboards, plywood etc.

844.1. Sap-staining Fungi

See also No. 2822.

2805. Aoshima, K., and Kobayashi, T. **[Durability of blue-stained Pine wood.]** *J. Jap. For. Soc.* 34 (9), 1952 (289–92). 4 refs. [E.e.]

Samples of *Pinus densiflora* were inoculated with pure cultures of *Ceratostomella* sp., *Leptographium* sp. or *Graphium* sp., left for 2 weeks at 25° C., and then autoclaved to kill the stain fungi. They were then inoculated with *Tyromyces squalens*, *Hirschioporus abietinus*, *Cryptoporus volvatus*, *Poria xantha*, or *P. vaporaria*. Loss of weight of the stained samples as compared with controls was measured after 6 months for *P. vaporaria* and 12 months for the other fungi. Results (tabulated) show no significant difference in loss of weight between stained wood and controls.

2806. Lindgren, R. M., and Harvey, G. M. **Decay control and increased permeability in Southern Pine sprayed with fluoride solutions.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (250–6). 8 refs. P.R.

Surface application of NaF and other fluorides, while favouring a heavy development of the common green mould, caused a striking reduction of decay and increase in permeability of Southern Pine. The mould seems to have contributed to the control of the decay fungi. The greatly increased permeability of the wood to water and aqueous solutions is probably due to the breakdown of ray cells by the mould.

2807. Bacon, L. R., and Conklin, D. B. (to Wyandotte Chemicals Corp.). **Composition for inhibiting sap stain.** *U.S. Patent* No. 2,549,358, April 17, 1951. pp. 4. P.O.

A composition for inhibiting sap stain and mould growth in green wood: 10–30% $Na_2B_4O_7$, 15–30% modified soda (approximately $Na_2CO_3 \cdot 1 \cdot 6NaHCO_3 \cdot 2H_2O$), 10–25% Na pentachlorophenate, and 35–55% of a mixture of primary alkylamine salts whose alkyl portion contains at least 8 carbon atoms, the impregnating solution containing 5–20 lb. of the composition per 100 gallons of water.

844.2. Wood-destroying Fungi

See also Nos. 2377, 2380–93, 2639–41, 2789, 2805, 2854, 2882.

2808. Mangenot, F. Recherches méthodiques sur les champignons de certains bois en décomposition. **[The fungi of certain woods in process of decomposition.]** *Rev. gén. Bot.* 59 (702–5), 1952 (381–99; 438–71; 477–519; 544–55). 55 refs. [F.f.] O.B.D.

The report, covering 3–4 years' investigations, presents data on: (1) cultures obtained from decayed wood of 3 hardwood species, (2) the fungus flora of several decayed hardwood species in the forest, i.e. fungi that had fructified on the trunk, and also fungi obtained in culture from the wood, (3) the reactions of the fungi in association with each other in the wood, (4) the decomposing properties of some of the fungi isolated on (*a*) wood, (*b*) cellulose and (*c*) various textiles, and (5) the evolution of fungus associations throughout the different stages of decomposition of the wood.

2809. Herzner, R. A. Über die Wechselwirkung verschiedener Holz- und Bodenarten: ein Beitrag zur Kenntnis der Korrosionsfestigkeit heimischer Hölzer. **[The reciprocal effects of various timbers and soils: a contribution to knowledge of the natural durability of Austrian timbers.]** *Zbl. ges. Forst- u. Holzw.* 71 (1/2), 1949 (4–19). 5 refs. [G.g.e.]

Reports on graveyard tests of 12 timber species in 5 soils differing in acidity and composition. In each soil, each species was represented by 8 samples (25 × 25 × 400 mm.) cut from 3 trees. Decay was assessed by the loss in weight after 2 years in the soil (October 1940–November 1942). Results indicate that decay depends both on species and on soil type. Taking the mean for all 5 soils, the species can be arranged in the following descending order of durability: Larch, Norway Spruce, Silver Fir, Pedunculate Oak, Austrian Pine, Scots Pine, *Prunus avium*, Robinia, Whitebeam, Birch (*B. verrucosa*), Beech, Hornbeam. The conifers lost most weight in acid soils, and the hardwoods in basic ones. The soils surrounding the decaying samples, especially the acid soils, mostly became considerably less acid by the end of the test. For Spruce, a comparison of the effect of decay on compression strength parallel to the grain, with weight losses of the samples, showed no clear correlation and it is suggested that measurements of change in compressive strength cannot replace the standard method of assessing decay by loss in weight.

2810. Richards, D. B. **An electrical test for decay in wood.** *J. For. Prod. Res. Soc.* 2 (4), 1952 (25–8, 70). 12 refs. P.R.

Previously weighed pieces of sapwood of Loblolly Pine and Red Gum (*Liquidambar styraciflua*) were subjected to decay by pure cultures of white- and brown-rot organisms. At 2-week intervals up to 14 weeks, samples were removed from the decay chamber, tested electrically at 5 megacycles with a Q-meter, weighed, measured, oven-dried, and re-weighed. The moisture content (m.c.) at time of testing, sp. gr. and % weight-loss due to decay were calculated, and their relation to dielectric constant and to conductivity were studied by means of multiple and partial regression analyses. M.c. had the greatest effect on the electrical properties, but there was also a highly significant partial regression of (*a*) the conductivity of the wood on the % weight loss due to decay, (*b*) the dielectric constant of the wood on its sp. gr. In the m.c. range studied the difference between a conductivity moisture-meter reading and a dielectric constant moisture-meter reading seemed to be a fairly good non-destructive tests for decay, the former being consistently higher than the latter for decayed pieces of wood. *From author's summary.*

2811. Kato, S., and Kamiizaka, M. **[Boring tests on structural timbers to determine their degree of**

decay.] *Bull. Tokyo Univ. For.* No. 42, 1952 (163–79). 6 refs. [Jap.e.]

Tests were done, mainly on $2 \times 2 \times 2$ cm. samples of *Tsuga sieboldii*, using ordinary round steel drills attached to an instrument (illustrated) specially designed for measurement of the specific torque energy of boring. The drill diameters were too small to reduce the strength of actual structural members. The following results were obtained: (1) Specific torque energy was calculated from the following formula, m and v being read from graphs made by the automatic recording gear of the instrument:

$$w = \frac{2\pi m}{\frac{\pi}{4} vd^2} = \frac{8m}{vd^2}$$

where w = specific torque energy (kg.-mm./cu. mm.), m = torque (kg.-mm.), d = diameter of drill (mm.) and v = penetrating depth of drill per rotation (mm.). (2) Using sound *T. sieboldii* the following relations were found: (*a*) an approximately linear relation between d and m; (*b*) an approximately linear relation between d and v; (*c*) a relation between d and w, expressed as $w = \frac{d}{0{\cdot}186d - 0{\cdot}18}$. A drill diameter of 1·8 mm. was chosen as standard. (3) With sound *T. sieboldii*, (*a*) there was only a slight relationship between w and spacing of annual rings (for 7–5 rings/cm. the correlation coefficient was 0·38) for radial boring; for boring along the grain w decreased 12 and 26% compared with radial boring for drill diameters of 1·6 and 2·3 mm. respectively. Standard tests were therefore made by radial boring. (*b*) There was no clear relationship between w and wood moisture contents from 10 to 90%. (*c*) The average w was 12·2 kg.-mm./cu.mm. (standard deviation 0·64). (4) For *Fraxinus commemoralis*, *Fagus crenata*, *Cryptomeria japonica* and *Chamaecyparis obtusa*, w = 14·0, 13·3, 9·9, and 11·7 kg.-mm./cu.mm. respectively. (5) For hardwoods a sharper-edged drill may be preferable. (6) With *T. sieboldii* inoculated with *Lenzites trabea*, w decreased with decay; after 5 months' decay it was 75% of that of sound wood. (7) Compressive strength of the decayed wood could be correlated with w, according to the expression $P = 11{\cdot}23\, e^{0{\cdot}323w}$ where P = compressive strength (kg./sq. cm.) and e is the base of natural logarithms. (8) The presence of decay could be detected from w after 3 months of decay, with the standard 1·8-mm. drill. The 3·0-mm. drill proved still more sensitive. (9) When *Chamaecyparis obtusa* and *Fagus crenata* were inoculated with *Trogia crispa*, w decreased by 12 and 20% respectively after 6 months, as compared with sound wood. (10) No clear relationship was found between w and the ratio of decrease in weight caused by decay.

The authors conclude that degree of decay in structural members can be judged with considerable accuracy by the measurement of w, and that this method is preferable to weighing. The use of a 3-mm. drill, where permissible on actual structural members, may be more effective than drills with smaller diameters. A portable instrument of the type constructed should have useful applications. The tables and graphs have English legends.

2812. KATO, S., and KAMIIZAKA, M. [**A new method of boring-test for determining the durability of structural wooden members [*in situ*].**] *Trans. 59th Mtg. Jap. For. Soc.* 1951 (242–4). 2 refs. [Jap.e.]

Cf. preceding abstract.

2813. SILVERBORG, S. B. **Fungi associated with the decay of wooden buildings in New York state.** *Phytopathology* 43 (1), 1953 (20–2). 15 refs.

Collections were made of 500 specimens of decayed wood from ca. 1500 buildings in New York state. The species of fungus isolated are listed in decreasing order of occurrence, with the types of structure in which they were found. The two species found most frequently were *Odontia spathulata* and *Lenzites saepiaria*. Other species of primary importance were *Fomes roseus*, *Poria xantha* and *Lenzites trabea*.

2814. DAVIDSON, R. W., and LOMBARD, F. F. **Large-brown-spored house-rot fungi in the United States.** *Mycologia* 45 (1), 1953 (88–100). 14 refs. P.R.

Cultures of *Merulius lacrymans* have been distinguished from cultures of the common species *M. americanus*. The two species may be separated by differences in growth rate and mycelial-mat characteristics when grown on 2% malt agar in 90-mm. Petri dishes. *M. lacrymans* grows best at a temperature of ca. 18° C. and does not grow at 28°. *M. americanus* grows best at 26°, well at 30°, and will even make slight growth at 34°. *Coniophora puteana* and *Poria incrassata* cause destructive decay in houses in the U.S.A.; they also have large brown spores. *C. puteana*, however, is a much faster growing fungus than the *Merulius* species, and *P. incrassata* may be differentiated from the others by its mat and type of growth. Temperature requirements of *C. puteana* and *P. incrassata* are similar to those of *M. americanus*. *From authors' summary.*

2815. OHASHI, H. [**Studies on *Panus stipticus* Fr. and *Trogia crispa* Fr.**] *J. Jap. For. Soc.* 34 (7), 1952 (220–3). 9 refs. [Jap.e.]

(1) The fruiting bodies of the two species and wood rotted by them were examined. Decay was considerable. (2) In culture their mycelium grew well at 15–30° C., 25° being the optimum. (3) In mixed culture the mycelium of *P. stipticus* covered that of *Cortinellus shiitake* slightly. (4) Both fungi showed positive Bavendamm reactions. (5) Test blocks of *Fagus crenata* attacked by *P. stipticus* for 10 months showed 27–38% decrease of dry weight in the upper levels of the media, 7·3–14% in the middle and 0·2–2·0% in the lower. Corresponding figures for *Chamaecyparis obtusa* attacked by *T. crispa* for 10 months were 8·4–9·5% for the upper and 0·2–2·2% for the lower levels. *From author's summary.*

2816. IWADE, I., FUKUZUMI, T., and YANAGAWA, R. [**Studies on the antagonism between Shiitake (*Cortinellus edodes*) and other wood-rotting fungi.**] *Bull. Tokyo Univ. For.* No. 43, 1952 (111–26). 6 refs. [Jap.e.]

Growth of different fungi in mixed cultures on various media, changes during the growth period in the pH of the medium, optimum pH values for the different fungi, and their respiration at different pH values were studied.

2817. Oppermann, A. Das antibiotische Verhalten einiger holzzerstörender Basidiomyceten zueinander und zu Bakterien. [**The antibiotic relationships of wood-destroying basidiomycetes to one another and to bacteria.**] *Archiv für Mikrobiologie, Berlin* 16 (4), 1951 (364–409). Many refs. [G.g.] O.R.S.

Cultures of 22 basidiomycetes and 1 ascomycete, made at distances of 5 cm. on malt agar and on wood, gave the following results: (1) Suspension of growth occurred before the mycelia touched in 67% of the cultures; (2) suspension of growth occurred when the hyphae touched, but not before, in 22%; (3) one fungus grew over the other without any previous suspension of growth in 6%; and (4) both mycelia met in a zone with few hyphae in 5% of the cultures. Slow growing fungi had a greater adverse effect on each other than fast growing ones. (5) A number of fungi had an antibiotic effect on bacteria, especially Gram-positive bacteria. Cultures of *Merulius lacrymans*, *Polyporus giganteus*, *Armillaria mellea* and *Pholiota mutabilis* in different media showed that the formation of antibiotic substances was related to the sources of C and N, but that the best conditions for their production varied with species. With *M. lacrymans* and *P. giganteus* production increased with the C concentration in the medium to 2% and then remained constant. A study over 8 weeks showed that the different fungi varied in the period during which they produced antibacterial substances. The results are summarized in tables. *From author's summary.*

2818. Akai, S., and Shishiyama, J. [**Studies on wood-decay. V. Physiological studies on *Trametes vittata* causing white rot of Pear stems.**] *Wood Res., Kyoto* No. 8, 1952 (28–43). 24 refs. [Jap.e.]

Describes the fungus and discusses the effect on cultures of temperature, pH, and nutrient supply, and of aqueous solutions of $CuSO_4$, $CuCO_3$, Cu $(CH_3COO)_2$ and $HgCl_2$. The relative resistance to decay of Beech, Chestnut, Japanese Cypress and Mume (*Prunus mume*) was tested in culture. Beech was most readily attacked, showing a marked decrease in dry weight, and Mume was most resistant. Temperature, moisture content and plane of the wood seemed to be important factors influencing the degree of decay. Decay was more rapid at 36 than at 28° C. *From authors' summary.*

2819. Shibamoto, T., Fukuzumi, T., and Yanagawa, R. **Studies on the scheme of decomposition of oxalic acid by some wood-rotting fungi, and its effect on the change of pH in a glucose malt medium.** *Bull. Tokyo Univ. For.* No. 43, 1952 (105–10). 7 refs. [E.e.jap.]

Cf. *For. Abstr.* 14 (No. 1653).]

2820. Mizumoto, S. [**Effect of sodium fluoride on the mycelial growth of *Lenzites subferruginea*.**] *J. Jap. For. Soc.* 34 (3), 1952 (91–4). 12 refs. [Jap.e.]

2821. Behr, E. A. **Wood preservation for the P[est] C[ontrol] O[perator].** *Pest Control* 20 (9), 1952 (23–4, 26). P.R.

Instructions relating to preservation of structural timber in buildings against fungal decay, with particular reference to the use of POL-NU, a grease containing 5% of pentachlorophenol, said to penetrate wood very well when applied by cold-soak treatment.

2822. Bakshi, B. K. **Decay and sap stain of timber, their causes and prevention.** *Indian For.* 79 (2), 1953 (108–14 + 5 photos). 3 refs.

Gives practical directions for the protection of logs from felling site to timber yard, with special reference to Indian conditions.

845. *Attack by Animals*

845.1. Marine Borers

2823. Owen, G. **Vertical distribution of *Teredo norvegica*.** *Nature, Lond.* 171 (4350), 1953 (484–5). 2 refs. [Department of Zoology, University of Glasgow.]

A wooden pile, 62 ft. long, was removed from a jetty at Loch Ryan, Scotland, and examined. It had been in service for 10 years. The distribution of entry holes over the seaward face of the pile showed an increase with increase of depth down to the mudline. The under-surfaces of horizontal structures suffered from a much heavier infestation than did vertical surfaces at the same level. These observations suggest that the larvae of *T. norvegica* tend to settle in increased numbers in dimly lit regions and that the presence or absence of a layer of silt is of little importance.

2824. Amos, G. L., and Tack, G. W. **Sub-project P.5–0: Marine borer investigations: miscellaneous tests. Progress report no. 1 and Sub-project W.S.3–1: Investigation of wood structure in relation to timber preservation. Progress report no. 4. Experiment W.S.3–1/3 Impregnation of timber with silica (first report).** Division of Forest Products, C.S.I.R.O., South Melbourne. [1952]. pp. 8 + [1] + 6 photos, 1 dgm. 5 refs. P.R.

SiO_2 was deposited by a 2-stage process using aqueous solution of Na silicate and HCl, in all the wood elements of small samples of *Pinus radiata* and in the vessels of *Ceratopetalum apetalum*. The deposits were similar to SiO_2 occurring naturally in some species and were resistant to leaching by sea water.

845.2. Terrestrial Borers

See also Nos. 1912, 2635, 2777, 2783, 2789.

2825. Fisher, R. C. **The biology of some timber insects [ambrosia beetles, *Lyctus*, furniture beetle, death watch beetle and termites] in relation to wood preservation [with discussion].** *Rec. [2nd] Conv. Brit. Wood Pres. Ass.* 1952 (28–36, 41–57).

2826. White, M. G. **A note on the presence of *Eurythyrea austriaca* L. (Col. Buprestidae) in Silver Fir from Yugoslavia.** *Ent. mon. Mag.* 89 (1065), 1953 (31–2). 3 refs.

Live adults of this buprestid were found in the floorboards of a Hampshire house. The timber was *Abies alba* imported from Jugoslavia. The type of damage greatly resembled that inflicted by *Hylotrupes bajulus*, but there are differences in the size of larval tunnels and in the composition of the bore dust. *E. austriaca* is known primarily as a forest pest.

2827. Rosel, A. **Project P.19. *Anobium* borer investigations. Sub-project P.19–2. The breeding of *Anobium*. Progress report No. 1. Preliminary observations on oviposition.** Division of Forest Products, C.S.I.R.O., Melbourne. 1952. pp. 8. 1 ref.

With sapwood blocks of *Podocarpus dacrydioides*, 97·3% of all eggs were laid on rough, sawn, end-grain surfaces. The average number of eggs laid per ♀ was 20·8, with a fertility of 95%. No difference was found in egg-laying when soil was used instead of paper as a foothold in the breeding jars.

2828. Spiller, D. **A study on control of infestations of the common house borer *Anobium punctatum* De Geer. Part I. Results for the period 1944–51.** *N.Z. J. Sci. Technol.* 33*B* (6), 1952 (447–59). 6 refs. P.R.

This paper discusses the methods adopted for, and results obtained from, a 5-year study. Two methods of application were adopted: hand gunning and brush treatment. When kerosene was applied by hand gunning, larvae survived in unpenetrated pockets in the wood. Hand gunning with kerosene containing a single insecticide (orthodichlorobenzene, paradichlorobenzene, naphthalene, trichlorophenol, or pentachlorophenol) did not give materially better results than were obtained with kerosene alone. Hand gunning with kerosene containing 10% dichloroethyl ether gave a complete kill of larvae; presumably the vapour of this insecticide diffused into the untreated pockets. Application of a series of petroleum solvents and creosote as a single brush coat showed that gas-oil gave almost complete control throughout the testing period, whereas with the other materials considerable emergence occurred. Much of the gas-oil was still present 30 months after application, distributed throughout the wood. When insecticides dissolved in kerosene were applied as single brush coats, only 5% *para-para* isomer DDT and 2% γBHC gave adequate control over all flights. *From author's summary.*

2829. Breny, R., and Straszewska, Z. Protection du bois: toxicité par contact de diverses préparations protectrices du bois, appliquées en solutions diluées. **[Wood preservation: the contact toxicity of several wood preservatives applied in dilute solutions.]** *Bull. agric. Congo belge* 1 (4), 1952 (1011–8 + 3 gphs.). [F.flem.]

A study was made to determine the direct action by contact in the laboratory, of a number of insecticidal substances used as wood preservatives, and belonging to several groups: (*a*) pentachlorophenols, (*b*) monochlornaphthalenes, (*c*) miscellaneous. The test organisms used were larvae of *Tenebrio molitor*. Substances belonging to group (*b*) were in general the most active and superior to those of group (*a*). The difficulty of comparing commercial preservatives is discussed. [Cf. *For. Abstr.* 14 (No. 1664).]

2830. Breny, R., and Straszewska, Z. Protection des grumes: considérations et essais préliminaires sur la protection, contre les insectes xylophages, des grumes fraîchement abbattues et non écorcées. **[The protection of logs: preliminary considerations and tests on the protection of freshly felled, unbarked logs against insect borers.]** *Bull. agric. Congo belge* 1 (4), 1952 (1919–36). 9 refs. [F.flem.] [Institut agronomique de l'État à Gembloux.]

Logs of Ash were sprayed in the forest directly after felling in May at the season when *Hylesinus fraxini* begins to swarm. Complete protection was afforded by 3 out of 4 of the pentachlorphenol preservatives, and 3 out of 4 of the monochlornaphthalene preservatives tested, by aldrin, and by shale-oil. The importance of complete coverage is stressed.

2831. **The Talh borer.** *Rep. For. Dep. Sudan Jan. 1950–June 1951*, 1952 (45–6).

Logs of *Acacia seyal* can be protected to some extent by barking and stacking vertically (the borers always attack the under side of logs).

845.3. Termites

See also Nos. 2777, 2825.

2832. **Report of laboratory tests to determine the resistance to termite attack of certain Malayan commercial timbers.** *Malay. Forester* 16 (1), 1953 (45–9).

Tests indicated that *Madhuca utilis*, *Shorea guiso* and *Palaquium maingayi* are all highly resistant to the attack of *Nasutitermes exitiosus* and *Coptotermes lacteus*.

846. *Steaming*

2833. Popović, V., and Perović, B. Ponašanje bukovog oblog drveta na povećani frontalni pritisak vazduha i zasićene pare. (Prethodno saopštenje.) **[Behaviour of Beech roundwood when its cross-cut surface is exposed to air or saturated steam under pressure. (Preliminary communication).]** *Glasn. šum. Fak., Beograd* No. 5, 1952 (265–9). [Serb.serb.e.]

Experiments conducted within 24 hours after felling on 22- to 25-cm., and 110-cm. logs cut from 16-, 19-, and 22-cm.-diam. Beech stems (55, 70, and 175 years old, respectively) have shown that, when compressed air (excess pressure 0·5–2·5 atm. for the shorter, and up to 9–10 atm. for the longer logs) was applied to one of the cross-cut faces, up to 4–5% by weight of water could be removed from the log. When saturated steam, up to 5 atm. pressure, was used, ca. 6% by weight of water was removed from a log 115 cm. long and 22 cm. diam. It is claimed that the time required for steaming by this method is considerably shorter than in chamber steaming. Compressed air and steam alike remove water first from the central and lastly from the peripheral log layers. Compressed air causes cracks from centre to periphery, whereas steam generates cracks from periphery toward the centre. Water was removed from both early and late wood.

2834. Lukić, N. Prilog poznavanju glavnih fizičkih i mehaničkih osobina parene i neparene bukovine. [**The chief physical and mechanical properties of steamed and unsteamed Beech wood.**] *Šumarstvo* 5 (6), 1952 (511–4). [Serb.f.]

Results are tabulated of shrinkage, compression and bending strength tests conducted on comparable samples of steamed (S) and unsteamed (U) Beech wood, taken from 5 representative stems (70–80 years, 32–35 cm. d.b.h., 19–24 m. high) at a height of 5 m. The shrinkage, in % of green-wood dimensions when seasoned to oven-dry condition, was found to be (min., max. and average values successively): radial shrinkage U 3·97, 6·25, 4·93; S 4·75, 7·90, 6·02; tangential U 10·82, 13·73, 12·05; S 12·20, 16·40, 13·80; volume U 14·70, 19·45, 16·63; S 16·85, 21·25, 19·10%. The volume shrinkage from green to air-dry (moisture content 18·9% for U and 16·6% for S) was: U 4·92, 9·37, 7·22%; S 8·48, 14·45, 11·94%. The coefficients of linear and volume shrinkage (i.e. the amount of shrinkage per 1% of moisture content, obtained by dividing the % shrinkage by the fibre-saturation m.c.) are nearly the same for U and S. Results of strength tests, (average of 40 measurements) when recalculated for 12% m.c. gave the following average figures: compression strength U 721·5, S 635 kg./sq. cm.; bending strength U 1216, S 1349 kg./sq. cm. Test samples were: 3 × 3 × 2 cm. for shrinkage, 2 × 2 × 3 cm. for compression, and 2 × 2 × 30 cm. for bending.

847. *Drying* (*Seasoning*)

See also Nos. 2628, 2716, 2728, 2769, 2776, 2833, 2853, 2887.

2835. Ogura, T. [**Studies on the mechanism of wood drying. 5. The relation between the diffusion coefficient and the moisture content of wood. 6. The solution of the diffusion equation for moisture in wood.**] *Bull. For. Exp. Sta. Meguro, Tokyo* No. 54, 1952 (165–86). 20 refs. [Jap.e.]

Cf. *For. Abstr.* 14 (Nos. 797–8).

2836. Stevens, W. C., and Pratt, G. H. **Kiln operator's handbook.** H.M. Stationery Office, London. 1952. pp. vi + 138 + 9 plates + 1 tbl. Price 10*s.* 6*d.*

A reference book containing sections on: moisture in timber; kiln seasoning and kiln design; operator's equipment and kiln instruments; preparation of a load for kiln drying; application of schedules; operation of a kiln; kiln maintenance; kiln testing; equilibrium moisture content and conditioning; seasoning degrade; miscellaneous kiln treatments; and kiln drying of veneers. There are appendices with tables showing the seasoning properties and recommended schedules for over 250 species arranged alphabetically under the commercial name and details of 8 kiln schedules.

2837. Smith, H. H. **Utilization of Western hardwoods.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (52–4). I.F.B.

Oregon and California are estimated to have between them 8000 million bd. ft. of hardwood. Present and prospective utilization of 9 hardwood species is discussed, and the seasoning of *Quercus kelloggii* described.

2838. Espenas, L. D. **The seasoning of one-inch Tanoak lumber.** *Bull. Ore. For. Prod. Lab.* No. 3, 1953. pp. 46.

Groups of 1-in., random-width, mill-run Tanoak [*Lithocarpus densiflorus*] boards were dried by (1) kiln seasoning from the green stage; (2) air drying during winter or summer to 20 or 30% moisture content, followed by kiln seasoning; and (3) solid piling with NaCl for about 3 days, then as (2). Results (tabulated) are assessed from degrade caused by seasoning defects and the amount of shrinkage. Both were greatest in (1), which takes about 5 weeks, and commercial possibilities using this method are not promising. Results of (2) (taking 4–9 months for air drying according to the season, in favourable localities) are promising and some kiln schedules are suggested. Kiln-drying time for air-dried stock is 5–8 days. The NaCl treatment gave no significant improvement.

2839. Campbell, G. S. **Sub-project S.6–5—Drying schedules for Mountain Ash (*E. regnans*). Progress report No. 7. Experiment S. 6–5/12—A comparison of the effect of three-shift and one-shift kiln operation on the drying time of 1-in. mixed sawn Mountain Ash (*E. regnans*). (First report.)** Division of Forest Products, C.S.I.R.O., Melbourne. 1952. pp. 9 + 1 gph. P.R.

In drying to a final moisture content of 12%, one-shift (i.e. discontinuous) operation seems to require nearly twice the drying time required for three-shift (continuous) operation. The total time during which heat is supplied to the kiln is much less for one-shift operation than for three-shift operation. *From author's summary.*

2840. Peič, N. N. Tipy lesosuški dlja massovoĭ suški pilomaterialov. [**Types of kilns for large-scale seasoning of timber.**] *Lesn. Prom.* 11 (6), 1951 (22–6). [Russ.]

Describes and discusses about 10 types of kiln now in use in the U.S.S.R. The economic efficiency of a kiln is measured by its 'specific output', i.e. the ratio of the annual output measured in terms of conventional lumber to the total internal capacity of the kiln; the technological efficiency is expressed as the uniformity of seasoning, measured by (1) the standard deviation from the average final moisture content, and (2) the magnitude of the variation coefficient. Tabulated data show that kilns with high-speed forced draught (not less than 1 m./sec.) have a specific output ca. 1·5–2 times that of kilns with natural, or low-speed draught and that they achieve a much more uniform distribution of final moisture content than other kilns. Research at the Central Institute for Scientific Research in the Mechanical Processing of Wood has shown that (*a*) for seasoning lumber of ordinary dimensions, 25 mm. thick, in stacks without interspaces but with the usual stickers, it is necessary to use drying velocities exceeding 1 m./sec. if both output and uniform seasoning are to be maintained; (*b*) raising of circulation to 2–3 m./sec. reduces by ca. 35–40% the time required for the seasoning of softwoods: (*c*) the

economic optimum of circulation velocity, as computed from the author's own data, slightly exceeds 2 m./sec. It is finally concluded that a velocity of 1 m./sec. should be taken as the standard minimum for batch-type kilns, and of 2 m./sec. for progressive-type kilns. Several types of kiln are described and illustrated, with particular reference to steam-jet forced-draught types, and recommendations made regarding different kilns for various purposes.

2841. HAMADA, R., MAKU, T., and KADITA, S. **[Wood drying by R.F. heating.]** *Wood Res., Kyoto* No. 8, 1952 (44–54). 2 refs. [Jap.e.]

Results of experiments on drying 6 × 6 × 6-cm. samples in an R.F. electric field of constant voltage drop (300 and 500 volts/cm.) and constant current (1 and 1·5 amps) are as follows: (1) at constant voltage drop, the drying rate first increases, then falls, a constant rate being uncommon. The inner temperature of the wood increases to about 100° C., is constant for a time, and then decreases gradually as the moisture content of the wood decreases. Inner temperature is always higher than surface temperature. When the electrical field is perpendicular to the grain, the moisture gradient in the wood is undulating, with a lower peak in the grain direction (I) than at right angles to it (II), while with the electric field parallel to the grain the moisture gradient still undulates, but the difference between (I) and (II) is less. (2) When constant current is applied, a period of constant drying rate intervenes between the increasing and decreasing rates. An inner temperature of 100° is maintained until a lower wood m.c. is reached than with constant voltage drop, and the temperature gradient is not steep. With the electrical field perpendicular to the grain, the moisture gradient resembles that for constant voltage drop, but parallel to the grain the curve is parabolic and the difference between (I) and (II) is negligible. For both constant voltage drop and constant current the drying period is shorter when the electrical field is parallel than when it is perpendicular to the grain. Results are shown in graphs with English legends.

2842. APTEKMAN, I. B. Suška lesa tokami vysokoï častoty. **[R.F. seasoning of wood.]** *Torfjanaja Promyšlennostj, Moskva* 28 (1), 1951 (23–5). [Russ.] L.S.

Illustrated description of the R.F. seasoning plant operating in a Soviet State mill at Naziya since September 1950. A board stack of 25 × 6500 mm. (= 1·7 cu.m.) is seasoned in 10 hours from an initial m.c. of 85% to 18%. Power consumption averages 80 KW.

2843. DUMITRESCU, N. ŞT. Camere de uscare în curenţi de înaltă frecvenţă. **[High-frequency seasoning kilns.]** *An. româno-soviet. Silv.* No. 10, 1951 (31–50). 11 refs. [Rum.]

A review of Russian literature.

2844. YAMAMOTO, T. **[The application of high-frequency heating to wood technology.]** *Bull. Tokyo Univ. For.* No. 41, 1951 (183–228). 18 refs. [Jap.e.]

Gives the results of some experiments on using R.F. heating in gluing and in seasoning some 12 Japanese hardwoods.

2845. TAYLOR, E. R. **Method of rapid drying of lumber and other materials.** *U.S. Patent* No. 2,546,706, March 27, 1951. pp. 4 + 4 dgms. P.O.

Narrow (strip) electrodes for diathermic heating are placed along the grain and moved gradually across the dried stick of lumber, thus heating successively new portions of the wood.

2846. NASH, J. G. **A method of wood seasoning on a small scale.** *Chem. & Ind.* 1952 (2), (40–1). P.R.

Samples of a number of types of wood have been seasoned by immersing them in a 20% solution of diacetone alcohol and petroleum ether. The rate of removal of water from a wooden block was found to be in roughly inverse proportion to the square of its thickness; it also decreases as the grain of the wood becomes closer. The duration of seasoning (end of the formation of water beads on the wood surface) ranged from 1 hr. for Spruce $\frac{3}{8}$ in. thick, to 100 hr. for green Apple wood $1\frac{1}{2}$ in. thick. Besides removing water, the solvent dissolves resin pockets and probably distributes some of the resin evenly throughout the wood.

848. *Timberyard Practice. Handling and Storage of Timber*

See also Nos. 2575, 2716, 2724.

2847. JUTA, E. H. P. Pasta penutup kaju. **[End coatings.]** *Rimba Indonesia* 1 (2), 1952 (86–90). [Jav.e.]

Describes end coatings used by the Forest Service and the timber industry in Indonesia. Before the war Preservax, a cold coating, was widely used and since the war Product No. 2295A of the N.V. Standard Vacuum Sales Company has given good results, though less good than Preservax. Attempts at the Research Institute at Bogor to obtain satisfactory end-coatings from indigenous sources have so far failed. *From author's summary.*

85. GRADING OF WOOD AND WOOD PRODUCTS

852. *Detection, Recognition and Assessment of Injuries and Defects*

See also Nos. 2339, 2611–3, 2617, 2622, 2628.

2848. CLAUSEN, V. H., and KAUFERT, F. H. **Occurrence and probable cause of heartwood degradation in commercial species of *Populus*.** *J. For. Prod. Res. Soc.* 2 (4), 1952 (62–7). 14 refs. P.R.

Presents tabulated and graphed results of an investigation showing that the discoloured heartwood of Aspen and other commercial Poplar species is inferior in toughness and compression strength and lower in sp. gr. than the sapwood that surrounds it. This phenomenon is explained by the degradation of the heartwood in standing, living trees by bacteria which are always present in abundance.

2849. PEJOSKI, B. Pridones kon poznavanjeto na bukovinata vo N.R. Makedonija. **[[Investigations on the red heartwood of] Beech in Macedonia.]** *God. Zborn. zemj-šum. Univ. Skopje* 3, 1951 (83–106). 17 refs. [Maced.maced.g.f.]

Presents results of investigations on the occurrence of false heart in the native Macedonian Beech, *Fagus moesiaca*. Nearly 500 stems were measured. The %

volume of false heart averaged: (1) for diam. class 21–30 cm., 11·1; 31–40 cm., 13·8; 41–50 cm., 15·7, 51–60 cm., 20·3; over 60 cm., 36%; (2) for E. aspect 11·8; W., 13·2, and N. 27·5% (no data for S. aspect), as the average of all trees of 21–60 cm. diam. False heart occurs in all Macedonian Beech forests, and the number of stems free from it is very small.

2850. Dadswell, H. E. **Structure of Eucalypt timbers in relation to properties.** [*Suppl.* to] *News Bull. int. Ass. Wood Anatomists* Sept., 1952. pp. 4.

Discusses brittle heart and methods of determining its presence, the anatomical and working characteristics of reaction wood and the effect on wood properties of changes in fibre length.

2851. Jayme, G., Harders-Steinhäuser, M., and Mohrberg, W. Einfluss des Zugholzanteils auf die technologische und chemische Verwendbarkeit von Pappelhölzern. **[Effect of the tension-wood content on technological and chemical utilizability of Poplar wood.]** *Papier, Darmstadt* 5 (19/20; 21/22; 23/24), 1951 (411–7; 445–7; 504–7). 18 refs. [G.g.] L.S.

During veneer peeling, tension wood in Poplar produces a rough, 'woolly' surface. Its kiln-dry density is higher than that of normal wood (e.g. tension wood of *P.* '*regenerata grandis*' 0·4473, normal wood 0·3286). Among the samples tested, the lowest kiln-dry density was found in *P. tremula* (0·2984–0·3694), the highest in *P. canescens* (0·4114–0·6274). The cellulose yield depends largely on the tension-wood content, the yield increase over normal wood being 2·91, 12·38, 15·76, and 20·55% when the tension-wood content was 22, 54, 57, and 71%, respectively. Celluloses from tension wood have a considerably lower furfural value, a lower lignin content, a higher water content, and contain ca. 14% less α-cellulose than celluloses from normal wood. [Cf. *For. Abstr.* 14 (No. 2613).]

2852. Holcombe, R. A. **Surface checking in furniture panels.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (122–7). 2 refs. P.R.

Results of an investigation on the surface checking of veneered furniture panels have shown that alternate conditions of high and low humidity cause fatigue of the finish film in specific areas of both Oak and Walnut panels, while Cherry and Maple veneers remain unaffected. The use of a high-grade synthetic varnish finish reduced panel checking more than lacquers or low-grade varnishes. Panels with the slack side of the face veneer exposed had a greater tendency to develop surface checks than those with the tight side exposed.

2853. Millett, M. A. **Chemical brown stain in Sugar Pine.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (232–6). 43 refs. P.R.

The known facts suggested that the materials responsible for staining are present in the sap and are concentrated at the surface during drying. Results showed that sugars and other materials present in the fraction of high water solubility are the substances primarily responsible for staining. This information was used to relate Sugar Pine staining to the browning that occurs when foods are dehydrated. Such non-enzymatic browning is known to be caused by furan derivatives, which are the primary degradation product of sugar. Stain-retardant chemicals showed little promise when used as simple dip treatments. It was concluded that the best means of controlling brown stain at the present time is to secure better co-ordination between cutting and processing operations, and to use moderate kiln-drying schedules. *Author's summary.*

2854. **Utilization of Douglas Fir cull logs.** *Rep. Pacif. Nthwest. For. Range Exp. Sta. 1951*, 1952 (10–2).

About 100 logs of peelable type but considered culls by current grading rules were selected in several logged-over areas and cut into veneer for 3-ply wood, with the face and back veneer free of material infected by white pocket rot (*Fomes pini*) and of C and D grades respectively, but with white-pocket material admitted for the centre ply as long as the veneer was smoothly and firmly cut and did not contain knot-holes or other defects beyond those allowed in standard plywood. The logs scaled a gross volume of 180,500 bd. ft. The wood was graded as: (1) sound wood; (2) white pocket infection, stain stage only, material usable in veneer; (3) white pocket, advanced to white pocket stage, but wood structure firm and strong, usable in veneer; and (4) white pocket, advanced to white pocket stage, wood structure soft and punky, not usable in veneer. The total scale of the study logs when firm white pocket was admitted was 145,410 bd. ft. The logs were cut into $\frac{1}{8}$-in. veneer by normal methods. Firm white-pocket wood was cut satisfactorily with the same lathe settings as for sound wood. Volume produced per day was less than for sound wood. Grade 1 peeler *Fomes pini* logs with a net scale of 26,440 bd. ft. actually produced 32,680 bd. ft. veneer (8 thicknesses of $\frac{1}{8}$-in. veneer each 1 ft. square was considered to equal 1 bd. ft.) of which 45% was graded as face, 19% as back and 36% as core stock. No. 2 logs yielded only 49,982 bd. ft. veneer from 60,120 bd. ft. (39% face, 18% back and 43% core) and the No. 3 logs 28,301 bd. ft. veneer from 35,910 bd. ft. (34% face, 19% back and 47% core). Yields are best when white pocket is concentrated into a few areas; logs in which it is scattered in small pencil-like areas are unpromising for salvaging.

853. *Grading of Logs*

2855. Parks, W. H. **Formation of quality classes for second-growth Douglas Fir logs based on lumber grade recovery.** *Abstr. of thesis*, in *J. For.* 50 (11), 1952 (868–9).

Cf. *For. Abstr.* 13 (No. 2583).

854. *Grading of Converted Timber*

2856. Pongracz, A. F. **Combination lighting for lumber grading.** *Timberman* 54 (2), 1952 (94–6).

Experimental work at the Western Pine Association Research Laboratory indicated that a combination of side and overhead lighting, in a 10/1 ratio, and balanced for colour gave the best results.

2857. Granum, H. Kvalitetssortering av konstruksjonsvirke. **[Quality grading of constructional timber.]** *Norsk Skogind.* 6 (11), 1952 (379–84). [Nor.] P.R.

Discusses the effect of wood density (determined from annual-ring breadth and late-wood content), slope of grain, moisture content and knots, on strength, and the requirements relating to these factors in the proposal for a Norwegian standard on quality grading of constructional timber to be published shortly.

86. PULP INDUSTRIES. CHEMICAL UTILIZATION OF WOOD

See also No. 2753.

861. *Paper and Cardboard Industry (Pulp, Paper, Cardboard, Fibreboards)*

See also Nos. 2269, 2567, 2652, 2665, 2851.

2858. ECHEVARRÍA, I. Las materias primas nacionales para celulosa. **[National sources of raw material for cellulose.]** In *Aspecto Militar del Problema Español de la Celulosa*, Escuela Politécnica del Ejército, Madrid. 1951. pp. 11–28 + 4 photos + 2 gphs. [Span.]

Discusses the home production of cellulose from species growing in Spain, with particular reference to yield and quality of pulp from *Pinus radiata*, *P. pinaster*, *Abies alba* and other species from Spain or Spanish Guinea.

2859. ISTAS, J.-R., and HONTOY, J. Composition chimique et valeur papetière de quelques espèces de bambous récoltées au Congo belge. **[The chemical composition and paper-making qualities of some Bamboos harvested in the Belgian Congo.]** *Publ. Inst. nat. Étude agron. Congo belge* (*Sér. tech.*) No. 41, 1952. pp. 23. 12 refs. [F.] Price *Fr.*25.

Gives the results of chemical analyses and pulping and paper-making tests on *Sasa japonica*, *S. kurilensis*, *Bambusa hoffii*, *B. vulgaris*, *Gigantochloa aspera*, and *Ochlandra travancorica*.

2860. BHAT, R. V., and ROY, D. P. **Indigenous cellulosic raw materials for the production of pulp, paper and board. Part XII. Chemical pulps and writing and printing papers from *ulla* grass (*Themeda arundinacea*, Ridley).** *Indian For.* 79 (1), 1953 (25–35 + 2 specimen sheets). 3 refs.

Cf. *For. Abstr.* 14 (No. 1700).

2861. BHAT, R. V., and JASPAL, N. S. **Indigenous cellulosic raw materials for the production of pulp, paper and board. Part XIII. Chemical pulps and writing and printing papers from *Trema orientalis*, Blume.** *Indian For.* 79 (2), 1953 (69–76 + 2 specimen sheets). 2 refs.

Bleached pulps in 46·0–49·8% yield can be prepared from the wood of *T. orientalis* by the sulphate process and can be used for the production of writing and printing papers when mixed with a long-fibred pulp, e.g. from Bamboo.

2862. **Tropical woods and agricultural residues as sources of pulp. A symposium.** *FAO For. & For. Prod. Stud.* No. 3, 1952. pp. 190. Many refs. Price $2·00 or 10*s*.

Papers presented at the 5th meeting of the FAO Technical Committee on Wood Chemistry held at Appleton, Wis., in September 1951. The 13 papers dealing with the properties of tropical hardwoods and their suitability for pulping, have already been dealt with in *Forestry Abstracts* from other sources. The second part of the symposium contains 4 papers on the pulping of straw and one on the characteristics of fibres from other agricultural residues.

Pulping and Pulp

2863. MULCAHY, P. J. **Mechanical equipment for fiberizing wood.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (72–8). 4 refs. I.F.B.

A general account.

2864. KIMURA, Y. **[Study on brown pulp. (Parts 1 and 2.) Studies on groundwood pulp (9 and 10).]** *Wood Res., Kyoto* No. 7, 1951 (18–32). 22 refs. [Jap.e.]

In experiments on *Abies mayriana* the influence of steam temperature on pulp quality (colour and strength), yield and energy consumption was investigated. The optimum was found to be ca. 160° C. Brown pulps obtained by steaming wood in an autoclave at 100–180° were analysed, and it is concluded from the results that the colouring and increasing strength of the pulp are due to qualitative changes in the wood components. *From author's summary.*

2865. SIHTOLA, H. Kuoripitoisesta havupuusahausjätteestä puolikemiallista selluloosaa: kokemuksia Veitsiluodossa. **[Semi-chemical pulp from softwood sawmill waste containing bark: experience at Veitsiluoto.]** *Pap. ja Puu* 34 (11), 1952 (409–18). [Fi.e.] Also in *Svensk PappTidn.* 55 (21), 1953 (807–15). [Sw.e.] P.R.

The Veitsiluoto mills have carried out extensive research on the semi-chemical pulping of unbarked sawmill waste, mainly Spruce and Pine with some Birch and Aspen. About 2500 trial cooks (each of 2 litres) were made in the laboratory in a series of 6 cooks, with cooking times ranging from 5 to 60 min., cooking temperatures from 130 to 200° C. and bark content from 0 to 24%. With high temperatures and low chemical ratios, either acid or alkaline, severe hydrolysis took place, destroying fibres and considerably reducing strength, colour and yield of pulp. A light, strong softwood pulp was made in less than 1 hr. after thorough pre-soaking of the chips. The pH value during the process must be kept slightly acid. This gave a slightly reduced lignin content but less than 20% lignin could not be obtained with yields above 60%. Burst and tear strengths showed a clear inverse relationship to the lignin content. Energy requirements for beating dropped rapidly when a lignin content of 28% was reached. The mill has produced Pine semi-chemical pulp from unbarked sawmill waste, with a yield of 65–67% and of 40 tons/day; most of this was sold to a roofing-felt mill. The cooking time was 23 min., temperature 192°, pressure 13·5 atm., and the consumption of chemicals 10–12% Na_2O (for oven-dry wood), of steam about 1 ton/ton and of power 250–350 KWH/ton of 90% dry pulp. The pulp had a bursting strength of 35 sq. m., tearing strength of 1·5 sq. m. and breaking length of 4000 m. at a beating grade of 50° SR and beating time of 45 min.

Fibreboards

See also No. 2896.

2866. Huguet, L. Utilisation intégrale des ressources de la forêt tropicale. (Étude d'un complexe agro-sylvo-industriel.) [**Integrated utilization of the resources of the tropical forest: a study of an agricultural-forestry-industrial complex.**] *Rev. for. franç.* 1953 (2), (69–80 + 2 photos). [F.]

An account of the Fibracel company of Ciudad Valles, Mexico, which manufactures fibreboard from the wood made available when clearing forest fallow for cultivation under the system of shifting cultivation practised in that region. The importance of the undertaking, (1) as part of the general economy, (2) from the point of view of tropical silviculture and the utilization of mixed tropical hardwood species, and (3) from the point of view of the traditional agricultural economy in the tropics, is discussed. An appendix gives data on the properties and uses of Fibracel boards and a list of the principal species used.

2867. Nowak, A. **Improvements in or relating to a process for the production of fibre plate and formed bodies of lignocellulosic materials using the lignin of the lignocellulosic materials as a binding agent.** *Brit. Patent* No. 674,079, June 18, 1952. pp. 4. P.O.

The desired decomposition of lignin is brought about by subjecting wood to (1) impregnation with a diluted lye, and (2) action of direct (or superheated) steam, after which the material is reduced to fibre fleece and processed as usual.

2868. Dietz, A. G. H., and O'Neill, A. J. **Investigation of physical and mechanical properties of wood waste board.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (72–5). P.R.

Presents results of tests on 'Plaswood' wood-waste board.

2869. Kitahara, K., and Mamada, S. [**The nail-holding power of hardened fibreboard.**] *Bulletin of the Tokyo University Forests* No. 39, 1951 (235–50). 8 refs. [Jap.e.]

Presents the results of tests on the nail-holding power and lateral margin resistance of a 5 mm.-thick hardened fibreboard prepared from the ground pulp of *Pinus densiflora*; the specific gravity of the board was 0·87 (air-dry) and 0·79 (oven-dry), the Brinell hardness 3·1 kg./sq. mm., and the moisture content 10% (air-dry). Empirical formulae are derived for relationships between the nail diameter, nail-head diameter, m.c. of board on the one hand, and the nail-holding power (maximum and mean), on the other, as well as for those between the lateral margin resistance and (*a*) margin depth, (*b*) m.c. Some formulae for [solid wood of?] *Chamaecyparis obtusa* are given for comparison.

2870. Hägglund, A. Några synpunkter på brandfara och brandskydd vid härdning av träfiberplattor. [**Fire danger and fire protection during the hardening of wood fibre boards.**] *Svensk PappTidn.* 55 (23), 1952 (879–84). 11 refs. [Sw.sw.] P.R.

2871. Lewis, W. C. **The hardboard industry in the United States.** *J. For. Prod. Res. Soc.* 2 (4), 1952 (3–6, 68). P.R.

The estimated daily productive capacity of the 16 existing hardboard plants in the U.S.A. by the end of 1953 is 2100 tons, equivalent to 5,800,000 sq. ft. of $\frac{1}{8}$-in-thick board, compared with 935 tons (2,500,000 sq. ft.) made by 3 plants in 1948. Hardboard (untreated or treated) is defined as fibreboard with a specific gravity within the range 0·80–1·15. Hardboards are essentially homogeneous sheet materials $\frac{1}{8}$ to $\frac{5}{16}$ in. thick, in panels as large as 4 × 16 ft.; they may have both, or one surface smooth. They are dense, hard, relatively stiff, and may have synthetic resins or drying oils added to give greater strength, stability, and water resistance. The basic manufacturing processes, uses, and properties of, and specifications for, hardboard are discussed.

2872. **Research pays off as board plant opens.** *Lumberm.* 79 (11), 1952 (62 . . . 69, 119).

Describes methods and machinery used by Anacortes Veneer, Inc., Anacortes, Washington, in the manufacture of Armorboard, a new hardboard panel, by a semi-dry process from solid old-growth Douglas Fir waste (including log centres and veneer trimmings) which accumulates in the plywood plant.

2873. Bonutto, A. L. **Hardboard properties as affected by volatile content of resin treated fiber.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (65–71). I.F.B.

Presents results of tests on a smooth $\frac{1}{4}$-in. board from a fibre type of waste and a liquid phenolic resin containing 43% resin solids. It was found that: (1) the density and flexural strength of boards increases with the increase in the liquid-resin content of the treated fibre and with the increase in pressure; (2) water uptake and swelling of boards are reduced by an increase in liquid resin content; (3) longer pressing times are required as the volatile content is increased; (4) increased temperature reduces the pressing time and has no appreciable effect on ultimate strength; (5) optimum values of density, flexural strength, tensile strength, water uptake and swelling, with the fibre and resin tested, were obtained at a volatile content of ca. 35% which is near the normal fibre-saturation point.

2874. Anderson, A. B., and Runckel, W. J. **Utilization of resinous wood in hardboard.** *J. For. Prod. Res. Soc.* 2 (5), 1952 (76–80). 5 refs. P.R.

Laboratory experiments and industrial experience show that a quality hardboard can be produced when resinous wood (Ponderosa and Southern Pine stumpwood, and extract-rich Ponderosa Pine mill waste) is used in varying combinations with regular wood fibre. No chemicals are required, and the process can be used in a conventional wet-hardboard plant.

2875. Stordalen, K. N., and Bollerslev, C. **The wet batch process of hardboard manufacture.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (58–9). I.F.B.

Description of the Chapman process.

2876. Runckel, W. J. **The wet continuous process of hardboard manufacture.** *J. For. Prod. Res. Soc.* 2 (3), 1952 (60–1). I.F.B.

A general description.

2877. Elmendorf, A. **Manufacture of hardboard out of wood waste.** *J. For. Prod. Res. Soc.* 2 (4), 1952 (7–9). P.R.

The following major processes are analysed from the technological and economic point of view: (1) continuous wet process, according to which the Masonite Pressdwood and most European hardboards are made; (2) batch wet process (hardboards made from sawmill waste or waste veneer, with a phenolic-resin binder); (3) semi-dry batch process (the fibres are not carried by water, but contain enough moisture to permit grinding); (4) continuous wet felting with dry pressing (so far, this method works on cordwood only, but there is no reason why it could not be used, once generally available, with wood waste); and (5) dry process for producing granular (as opposed to fibre) hardboard.

2878. **Hardboard from slabwood.** *Wood* 18 (2), 1953 (48–51).

Describes in detail a process of making hardboard from the untreated slabwood, including 20–45% by weight bark, of Douglas Fir, White Fir, Hemlock and Ponderosa Pine. [Cf. *For. Abstr.* 13 (Nos. 1709, 3474).]

2879. Voss, K. Die Wärmebehandlung von Holzfaser-Hartplatten. **[Heat treatment of hardboards.]** *Holz Roh- u. Werkstoff* 10 (8), 1952 (299–305). 14 refs. [G.g.] P.R.

Presents the results of tests on the properties and behaviour of German resin-bonded hardboards made from softwood waste when subjected to heat treatment of the order 140–180° C./15 min.–50 hr. Water sorption (after 2, and after 24 hr.), and swelling in water have shown similar trends in relation to the duration of heat treatment and the % decrease of water sorption (or swelling) compared with untreated hardboards. The respective sets of curves during the first 5 hr. or so show a rapid fall but thereafter nearly constant values; the higher the temperature of heat treatment the better the quality of hardboard obtained after the same period. Bending and tensile strength tests have shown similar behaviour: heat treatment causes first a slight increase of strength, which, as the period of treatment lengthens, tends to a maximum value (averaging ca. 10% higher than for untreated specimens) after which the strength value drops, rapidly for higher temperatures, less rapidly for lower temperatures. Thus bending strength was increased by 20% after 1 hour, and fell to 50% below normal after 13 hr. treatment at 180°; for 160°, the figures were: + 16% after 2–3 hr., and − 28% after 30hr.; for 150°, + 12% after 4 hr., and − 18% after 50 hr.; and for 140°, + 12% after 12 hr., and + 4% after 50 hr. Tests on hardboards without a resin binder, made by alkaline process, have shown that heat treatment decreases their water sorption and swelling, and increases their bending strength.

2880. Siempelkamp, E. **Improvements in or relating to apparatus for the manufacture of sheet- or plate-like products from wood, wood fibres, wood chips, and similar substances or mixtures of substances.** *Brit. Patent* No. 675,135, July 2, 1952. pp. 4 + 4 dgms. P.O.

863. *Wood Hydrolysis. Saccharification*

2881. Desforges, J. L'hydrolyse du bois par le procédé A. Hereng. **[A. Hereng's method of wood hydrolysis.]** *Chim. et Industr.* 67 (5), 1952 (753–60). [F.] D.S.I.R.

An illustrated description of a new method utilizing conc. HCl. It differs from Bergius' method mainly in embodying a continuous-diffusion (hydrolysis) principle, the wood waste being fed in at the top of the hydrolyser and arriving at the bottom after ca. 4 hours. The conc. HCl solution is added at different stages of the process, while 96–98% HCl gas is fed in in a counter-current at the bottom of the tower. Recirculation of part of the hydrolysate in the upper part of the tower yields a solution containing 20–25% of pentoses. The main product, consisting of lignin with sugars, is dried in a drier by anhydrous HCl. The dehydration of HCl is effected by means of a saturated solution of $CaCl_2$. The method requires much less manpower than that of Bergius and can be applied economically to industrial units having a consumption of as little as 6 tons of wood waste.

864. *Utilization of Lignin*

See Nos. 2641–2.

866. *Utilization of Wood Extractives*

See also Nos. 2646–8.

2882. Bhattacharyya, B., Datta, A., and Baruch, H. K. **On the formation and development of agaru in *Aquillaria agallocha*.** *Sci. & Cult.* 18 (5), 1952 (240–2). 8 refs. E.M.B.

In experiments dealing with the formation of agaru, a fungus identified as *Epicoccum granulatum* has been repeatedly isolated from infected wood. Its morphology is described. The anatomy of both inoculated wood and naturally infected wood was investigated by differential staining. Hyphae were found to be both inter- and intracellular. The cell walls were delignified and hyphae were present in the resinous cavities of the wood. Drops of yellowish-brown oil were found in the resinous cavities. The growth rate of the fungus on different media, and the nature of the pigments were studied. Spectroscopic analysis of extracts from wood and from Dox-medium on which the fungus had grown indicated the presence of anthoxanthins. [Cf. *For. Abstr.* 6 (p. 251), 13 (No. 3477).]

867. *Destructive Distillation*

See also No. 2654.

2883. Shibamoto, T., Minami, K., and Endo, K. **[Studies on carbonization of wood. IX. Thermal decomposition of *Quercus glauca* and its methanol lignin.]** *J. Jap. For. Soc.* 34 (2), 1952 (48–52). 7 refs. [E.jap.]

Cf. *For. Abstr.* 13 (Nos. 789–90).

2884. Shibamoto, T., Minami, K., and Kodama, T. **[Studies on the carbonization of wood (X). Thermal decomposition of *Quercus glauca* Thunb. and its lignins.]** *J. Jap. For. Soc.* 34 (3), 1952 (77–82). 2 refs. [E.e.jap.]

Wood flour of *Q. glauca*, and its methanol- and HCl-lignins were subjected to destructive distillation; yields of the distillate and its total acid, volatile acid, and methoxyl contents are tabulated.

2885. Shibamoto, T., and Kawana, A. [**Studies on the carbonization of wood (XII). The effect of a movable iron sheet barrier on charcoal making with the Kiyosumi earthen kiln, type G. (the Kiyosumi earthen kiln type G2).**] *Bull. Tokyo Univ. For.* No. 43, 1952 (127–38). 4 refs. [Jap.jap.e.]

The new type gave better results than the original type G. [Cf. *For. Abstr.* 13 (No. 790).]

2886. Makarov, F. N. Agregat dlja zagotovki gazogeneratornyh čurok. [**Machine for making wood blocks for gas-producers.**] *Lesn. Prom.* 11 (8), 1951 (16–8). [Russ.]

The set-up consists of a feed-conveyor, a pendulum saw, a rotary cleaver of novel design, and a band conveyor. The output during tests reached 13 cu.m. per shift.

2887. Ionov, M. I. Perenosnaja sušilka dlja drevesnyh čurok. [**Transportable drier for wood blocks.**] *Lesn. Prom.* 11 (9), 1951 (26–7). [Russ.]

Illustrated description of an easily made drier designed for the winter drying of wood blocks used as fuel in gas-producers. The drier was made from a discarded stumpwood-resin still of 1·5 cu.m. working capacity. The drying of a batch takes 6–7 hours, with a consumption of fuel amounting to 15–20% of the weight dried. At very low temperatures, the apparatus was jacketted in wooden boards.

2888. Les Consommateurs de Pétrole, S.A. Procédé et appareillage pour la fabrication, à partir du bois et de toutes autres matières cellulosiques, de produits de remplacement des dérivés du pétrole. [**Method of and apparatus for the manufacture of substitutes for petroleum derivatives from wood or any other cellulose-containing material.**] *French Patent* No. 977,445, April 2, 1951. pp. 4 + 1 dgm. P.O.

Wood is dissolved in wood-tar or another appropriate substance at between 200 and 300° C. and 50–150 atm. pressure, then subjected to a cracking process with hydrogenation at 550–600°; the gaseous products are then made to react in the presence of a catalyst, after which the pressure and temperature are lowered and the liquid produced is subjected to fractionation.

89. OTHER ('MINOR') FOREST PRODUCTS

See also section 28.

892. *Vegetable Products*

See also Nos. 1954–6, 2508.

892.4. Bark Products. Tanstuffs. Cork

See also Nos. 2690, 2865

2889. Haglund, A. Beiträge zur Kenntnis des Fichtenrindengerbstoffes. II. Änderung der Alkohol-Fällungszahl bei fraktionierter Extraktion der Fichtenrinde. [**Spruce-bark tannin. II. Change of the alcohol precipitation number during the fractionated extraction of Spruce bark.**] *Leder, Darmstadt* 2 (9), 1951 (205–7). 5 refs. [G.] L.S.

[Cf. *For. Abstr.* 13 (No. 2623).] It was found that, when extraction is conducted on the counter-current principle, the Spruce bark extract shows in the last extractor (almost exhausted bark and fresh water) the highest alcohol precipitation number, and the lowest ratio of fraction II (portion remaining in solution when the extract is precipitated with C_2H_5OH). The change in extracts during the fractionated extraction can be easily checked by determining either the alcohol precipitation number or the viscosity of the fractions.

2890. Rao, P. H. **Iron wood of Malabar as tanning material.** *Sci. & Cult.* 18 (5), 1952 (243). E.M.B.

Gives the results of analysis of bark of *Hopea parviflora*.

2891. Čadež, Z. Hrastove šiške kao biljna štavila. [**Oak galls as tanstuffs.**] *Šum. List* 76 (9), 1952 (312–25). 8 refs. [Croat.croat.e.]

Detailed description of Oak galls (formed by *Cynips quercus calicis* from the gynaecium or young fruit of Oak), their harvesting, drying, cleaning, grading, transport, and storage. The best yields are obtained from *Quercus pedunculata* stands, 60–150 years old, density 0·4. The maximum yield attains 250 kg./ha. (dry galls). A conservative average figure for Jugoslavian Oak forests is 30–50 kg./ha. The tannin content of the galls is 25–34%, average 28%. The cold and hot extraction processes, and the three commercial forms of extract are described: the liquid extract contains 25–30% of tannins, the solid extract (powder or lumps) ca. 65%. The Jugoslavian standard for powdered extract is: tannin—max. 58%; insolubles—max. 8%; ash—max. 4%; pH—3·9–4·6; sediment after 24 hours—max. 40%.

2892. Anderson, H. **The tannins of certain Eucalypt species and *Pinus radiata*.** *Journal of the Society of Leather Trades' Chemists, Croydon* 36 (7), 1952 (211–7). 4 refs. L.S.

An extract prepared from a mixture of *E. sieberiana*, *E. baxterii*, *E. yangoura*, *E. consideniana*, and *E. obliqua* is characterized by 60% tannin content and a very high acidity. Investigations of *Pinus radiata* cultivated in Australia have shown that the bark in the lower portion of the tree is fairly rich in tannins (up to 30%). [Cf. *For. Abstr.* 11 (Nos. 3149, 3150).]

2893. **Spent Mangrove bark from North Borneo.** *Colon. Plant Anim. Prod.* 3 (1), 1953 (53–5).

Samples of Mangrove bark residues from the extraction of tannin were examined. The high ash content and alkali solubility combined with low cellulose content and very short fibre length would make the use of this material for the manufacture of paper pulp quite uneconomic. The calorific value is lower than that of dry wood fuel (8000–9150 B.Th.U./lb.). The rather high pentosan/furfural content might be of commercial interest if sufficiently large quantities (14,000–15,000 tons p.a.) were available for the production of furfural.

2894. Ribas-Marquès, I. Étude sur la constitution chimique du liège. [**A study of the chemical**

composition of cork.] *Chim. et Industr.* 68 (3), 1952 (333–50). 32 refs. [F.] D.S.I.R.

A detailed survey of research conducted since ca. 1880 on the following problems: chemical composition of cork ash; ceroid fraction; suberin; fatty acids; glycerol, and cork cellulose.

2895. JENSEN, W. **Studies on suberin. IV. Isolation of phloionic acid from suberin of *Quercus suber*.** *Pap. ja Puu* 34 (12), 1952 (467–8, 470). 8 refs. [E.] P.R.

Cf. *For. Abstr.* 12 (No. 2232).

2896. ÖMAN, E. **A method of manufacturing boards or plates from bark and straw, and boards or plates manufactured according to said method.** *Brit. Patent* No. 673,767, June 11, 1952. pp. 2. P.O.

Bark is comminuted into particles below 40 mm. (preferably below 10 mm.) mixed with straw pulp, and shaped into plates or boards.

2897. ROW, L. R. **New flavones from *Pongamia pinnata* (L.) Merr.** *Aust. J. sci. Res. 5A* (4), 1952 (754–9). 9 refs. P.R.

892.5. Medicinal Plants, Edible Plants, Insecticides from Plants etc.

2898. FISCHER, G. **A phagicidal and virucidal agent in Maple fruit (*Acer platanoides* L.) preparations: investigations with *E. coli* bacteriophage and vaccinia virus.** *Acta Pathologica et Microbiologica Scandinavica, København* 31 (4), 1952 (433–47). 35 refs. [E.e.] [Karolinska Institut, Sweden.] O.P.

A phagicidal and virucidal compound extracted from the fruits of *A. platanoides* has been named acerin. It destroyed phages of *Escherichia coli* in 5 — 30 min., and vaccinia virus in 5 min., but its effect on *Staphylococcus* Twort phage was less pronounced. It proved non-toxic when administered subcutaneously to mice and rabbits. *From author's summary.*

2899. BHATTACHARYA, A. **Kopsine, an alkaloid of *Kopsia albiflora* L.** *Sci. & Cult.* 18 (6), 1952 (293–4). 4 refs. [University College of Science and Technology, Calcutta.] E.M.B.

2900. MUKHERJEE, J. N. **Studies on the pharmacology of rauwolscine, the alkaloid of *Rauwolfia canescens* Linn.** *Sci. & Cult.* 18 (7), 1953 (338–9). 11 refs. E.M.B.

2901. CHAUDHRY, G. R., SHARMA, V. N., and DHAR, M. L. **The alkaloids of *Stephania glabra* Miers.—Identity of gindarine and gindarinine with tetrahydropalmatine and palmatine respectively.** *J. sci. industr. Res., India* 11*B* (8), 1952 (337–9). 3 refs. D.S.I.R.

2902. NELSON, E. R., and PRICE, J. R. **Alkaloids of the Australian Rutaceae: *Pentaceras australis* Hook. F. III. Identification of 4-methylthiocanthin-6-one.** *Aust. J. sci. Res. 5A* (4), 1952 (768–81). 18 refs. P.R.

The alkaloid $C_{15}H_{10}OSN_2$ occurring in the bark of *P. australis* is shown to be 4-methylthiocanthin-6-one.

2903. HILLS, K. L., BOTTOMLEY, W., and MORTIMER, P. I. **Occurrence of nicotine together with hyoscine in *Duboisia myoporoides* R.Br.** *Nature, Lond.* 171 (4349), 1953 (435). 2 refs.

Seedlings of *D. myoporoides* grown from seed of New Caledonian origin were analysed by partition chromatography and yielded both nicotine and hyoscine. Plants of Australian origin contain large amounts of hyoscine, but no nicotine. The possibility of the New Caledonian material being a cross with *D. hopwoodii*, which contains nicotine but no hyoscine, is very remote, owing to the geographical remoteness of New Caledonia from the area in which *D. hopwoodii* occurs (the interior of the Australian continent), and the morphological similarity of this material to *D. myoporoides* does not support a theory of hybrid origin. The New Caledonian form may be a relict of a primitive form from which the genotypes of the Australian mainland originated. This appears to be the first time that alkaloids of the tropane and pyridine groups have been observed in the same plant, or even in the same species.

2904. SHIMADA, H., SAWADA, S., and FUKUDA, S. **[Constituents of the bark of *Aesculus turbinata* Bl. (*Hippocastanaceae*). II.]** *Journal of the Pharmaceutical Society of Japan, Tokyo* 72 (1), 1952 (61–2). 4 refs. [Jap.e.] L.S.

Fraxin (as glucoside) has been found in this Japanese tree.

2905. SHIMADA, H. **Constituents of the bark of *Fraxinus* species (Oleaceae). III–VI.** *Journal of the Pharmaceutical Society of Japan, Tokyo* 72 (1; 4), 1952 (63–9; 498–500). [Jap.e.] L.S.

The first part was published in Vol. 58, 1938 (636), the second in Vol. 60, 1940 (508).

III.—The presence of aesculetin was confirmed in *F. intermedia*, *F. spaethiana*, *F. sieboldiana* var. *angustata*, and *F. kantoensis*. Fraxetin was found in *F. intermedia* along with aesculetin.

IV.—A crystalline substance of m.p. 172–3° C. was obtained from *F. mandshurica* and its var. *japonica*, identical with fraxinol obtain by Späth from *F. excelsior*.

V.—Syringin, m.p. 192–3°, was obtained from bark of *F. verecunda*.

VI.—*F. borealis* contains aesculin, fraxin and mannitol. *F. longicuspis:* one provenance—aesculetin and fraxetin; another provenance—aesculin and mannitol. *F. sambucina* var. *pubescens*—aesculetin and fraxin; var. *velutina*—aesculetin.

892.6. Resin and Turpentine. Essential Oils. Fixed Oils and Fats. Gums. Latex Dyestuffs. Sap Sugar

See also Nos. 2260–8.

2906. PEJOSKI, B. Pridones kon tehnološkoto poznavanje na crvenata smreka (*Juniperus oxycedrus* L.). **[Technological tests on *J. oxycedrus*.]** *God. Zborn. zemj.-šum. Univ. Skopje* No. 3, 1951 (107–21). 21 refs. [Maced.e.f.]

Presents the following results of tests on the wood of *J. oxycedrus* from Macedonia, and on some of its minor products:—(1) refractive indices: turpentine,

1·508; 'Cedar-oil' from turpentine, 1·504; oil from leaves, 1·470; (2) yields of essential oil: from leaves, 0·31–0·68%; from cones, 0·46–0·78%; (3) density at 15° C. of essential oil from leaves, 0·853; (4) sp. gr. of wood: oven-dry, 0·58; air-dry 0·69; (5) shrinkage: radial, 4·83; tangential, 7·47; longitudinal, 0·34%. *J. oxycedrus* grows very slowly; a tree of 10 cm. d.b.h. was 60, and another of 18 cm. was 110 years old.

2907. Pejoski, B. Razvoj industriskog smolarenja u prvom petogodišnjem planu (1947–1951). [**The development of industrial resin-tapping in the first Five-Year-Plan (1947–51) in Jugoslavia.**] *Šum. List* 76 (1/3), 1952 (25–35). [Croat.f.]

2908. Bhushan, B., and Gulati, K. C. **Studies in Indian turpentine [from *Pinus longifolia*.] Part IX. Preliminary experiments on hydroxylation of higher fractions.** *Abstr.* in *Proc. 38th Indian Sci. Congr.* Part III, 1951 (102–3). C.G.B.

2909. Désalbres, L. Les huiles de pin de flottage. [**Flotation oils from Pine.**] *Chim. et Industr.* 68 (6), 1952 (880–8). 6 refs. [F.] D.S.I.R.

Describes 'Pine oil', both the natural product obtained by the distillation of resin obtained from Pine stumps in America, and the synthetic product obtained in France from the turpentine oil of *Pinus pinaster*. While the former is composed of 70% of tertiary alcohols, 20% of secondary alcohols, and 10% hydrocarbons, the latter consists of 82% terpineols, 7% terpinene-ol, and 10% hydrocarbons. Pure terpineol is one of the best foam-producing agents available. The behaviour of the different constituents of synthetic Pine oil in a water/gas system is analysed, and some tests conducted with mixed ores are described in detail. Methods of chemical and physical analysis of Pine oil are discussed. The author concludes that, while terpineol (a tertiary alcohol) is the most soluble and the most active foam-producing agent present in Pine oil, its hydrogenation products (menthan-8-ol), although slightly less soluble and active, is more selective than terpineol.

2910. Nair, G. V., Poti, A. N., and Pillay, P. P. **The constituents of lacquer-bearing trees of Travancore-Cochin: Part I—Chemical examination of the constituents of *Holygarna arnottiana* Hook. F.** *J. sci. industr. Res., India* 11*B* (7), 1952 (294–7). 7 refs. D.S.I.R.

The lacquer-forming ingredient present in the different parts of *H. arnottiana* has been isolated and identified as laccol (3-heptadecadienyl catechol). An interesting observation is the presence of laccol in the fixed oil of the seed kernel. The kernel oil, freed from the laccol-containing oily fraction, consists of the glycerides of oleic, linoleic, palmitic and stearic acids. The unsaponifiable matter contains phytosterol. *Authors' summary.*

2911. Nair, G. V., Poti, A. N., and Pillay, P. P. **The constituents of lacquer-bearing trees of Travancore-Cochin: Part II—Chemical examination of the latex of *Semecarpus travancorica* Bed.** *J. sci. industr. Res., India* 11*B* (7), 1952 (298–9). D.S.I.R.

The bark exudation of *S. travancorica* contains about 21% laccol. The tarry residue, obtained after the separation of laccol, polymerizes on standing to a shining friable mass, soluble in ether, alcohol and acetone. *From authors' summary.*

2912. Stanković, S. Č., and Senić, R. Prilog kvantitativnom određivanju eteričnih ulja u četinama. [**Quantitative determination of essential oils in needles of conifers.**] *Glasn. šum. Fak., Beograd* No. 5, 1952 (271–81). 27 refs. [Serb.serb.e.]

The needles are boiled in water, and the essential oils distilled off with the steam. The end of the isolation by distillation is determined by plotting the graph of refractive indices of the petroleum-ether extracts of the successive fractions. The refractive-index/concentration graph for the petroleum-ether solution of a given essential oil (nearly a straight line) and the refractive index of the pure essential oil, enable the concentration of the solution, and hence the quantity of the isolated oil to be evaluated.

2913. Miyazaki, M. [**Constituents of the essential oil of *Picea jezoensis* Carr., obtained by sulphuric acid stimulation.**] *J. Jap. For. Soc.* 34 (6), 1952 (196–200). 8 refs. [Jap.e.]

The physical and chemical properties of the oil, obtained by 50% H_2SO_4 stimulation, were studied and the constituents of its fractions determined.

2914. Shaw, A. C. **The essential oil of *Abies balsamea* (L.) Mill.** *Canad. J. Chem.* 31 (2), 1953 (193–9). 12 refs. P.R.

Foliage of *A. balsamea* yielded 0·591% of an essential oil consisting of *l*-β-pinene, *l*-bornyl acetate, *d*-Δ^3-carene, *l*-limonene, *l*-α-pinene, *l*-camphene, myrcene, santene, tricyclene, *l*-camphor, *l*-borneol, *d*-canadene, bisabolene, terpinolene, and a compound related to S-guiaiazulene. *Author's summary.*

2915. Miyazaki, M. [**The constituents of the essential oil of Todomatsu-balsam (supplement).**] *J. Jap. For. Soc.* 34 (7), 1952 (211). 1 ref. [Jap.e.]

l-Limonene, as well as the constituents previously reported [cf. *For. Abstr.* 13 (No. 812)] was found in the essential oil of resin from *Abies mayriana* and *A. sachalinensis.*

2916. Neybergh, A. G. Quelques plantes à essences dans l'est de la colonie. [**Some plants grown for their essential oils in the east of the Belgian Congo.**] *Bull. agric. Congo belge* 14 (1), 1953 (1–40). [F.flem.]

Gives analytical data on the essential oils of a number of species, including *Eucalyptus smithii, E. citriodora, E. dives, E. macarthuri, E. maideni, E. globulus, Leptospermum citratum, Melaleuca leucadendron,* and *Cupressus sempervirens.*

2917. Kurata, T. [**Microscopic observations on the position and structure of oil cells of the Camphor tree (*Cinnamomum camphora*).**] *J. Jap. For. Soc.* 34 (7), 1952 (232–4). 8 refs. [Jap.e.]

2918. Mukerji, B. K. **A short note on mahua cake and its use.** *Agriculture and Animal Husbandry, Lucknow* 2 (1), 1951 (14–6). 4 refs. [E.] C.G.B.

A short account of the use as fodder and as manure

of *mahua* cake, left as residue after the extraction of oils from seeds of *Bassia latifolia* and *B. longifolia*.

2919. Pinto, G. Pereira. O óleo de uacú (*Monopteryx uacu* Spruce) Leg. Pap. (Seu estudo químico). **[Oil of *M. uacu*—a chemical study.]** *Bol. téc. Inst. agron. Norte* No. 21, 1950 (31–62). 18 refs. [Port.e.]

2920. Reader, D. E. **Gutta-percha.** *Colon. Plant Anim. Prod.* 3 (1), 1953 (33–45). 14 refs.

Describes collection, treatment and uses of gutta-percha from several species of Sapotaceae and gives figures of production in a number of countries.

892.7. Fruits, Seeds. Fibres, Yarns and Flosses

See also No. 2918.

2921. Acosta-Solis, M. Las fibras y lanas vegetales en el Ecuador. **[Vegetable fibres and yarns in Ecuador.]** *Contribución, Instituto Ecuatoriano de Ciencias Naturales, Quito* No. 21, 1952. pp. 79. 31 refs. [Span.]

Discusses types of fibre, their uses and nomenclature, and presents a list of species (in alphabetical order of vernacular names), with notes.

9. FORESTS AND FORESTRY FROM THE NATIONAL POINT OF VIEW. SOCIAL ECONOMICS OF FORESTRY

90. GENERAL

902. *History of Forests and Forestry*

See also No. 2944.

2922. TURC, L. Les sources de la sylviculture de Maclot: la réformation de 1542. [**The origins of 'La sylviculture de Maclot': the reformation of 1542.**] *Rev. for. franç.* 1953 (2), (94–112). [F.]

An account of the methods by which the medieval salt works at Salins near Chalons were supplied with firewood, and the orders that were drawn up in 1542 to regulate the silviculture of the woods from which it was obtained.

2923. BELTRAM, V. Slavonski gozd. [**The Slavonian forest.**] *Gozd. Vestn.* 8 (6/7), 1950 (183–96). [Sloven.croat.e.]

This is one of the most characteristic forest types of Jugoslavia; its main species is *Quercus robur*. Even to-day, Oaks of 250–300 years, and 150 cm. d.b.h., can be found. One of the forest areas along the Sava, which comprised in 1820 as much as 127,000 ha. of Oak forest, had 14% fellings by area in 1820–60, and 80% in 1860–1920, so that in 1920 only 6% of the area has trees over 140 years old. In the second decade of this century, the forests were attacked by *Lymantria dispar* and *Microsphaera alphitoides*, particularly the middle-aged trees. The author suggests that the old and young stands grew in natural conditions, while the middle-aged stands are mostly pure Oak that was subjected to thinnings and other silvicultural measures. The natural plant associations (with the light-demanding Willow, Poplar, Ash, Alder, and shade-bearing Elm, Lime, Maple, Hornbeam, and Beech) were destroyed. The harmfulness of Oak monocultures was generally recognized in Jugoslavia only just before the second world war. During the inter-war period, *Lymantria dispar* continued its attacks, and *Ceratostomella ulmi* made great inroads in Elm stands. *Lymantria* remains the main enemy. In 1943, the Oak forests were attacked by larvae of *Nygmia phaeorrhoea*. The micro-relief of the soil in the floodlands has been greatly changed by the building of large dams along the Sava since 1950 and the drainage of the lower marshy grounds. These circumstances call for new silvicultural measures. [Cf. *For. Abstr.* 14 (No. 2926).]

903. *Forest Policy, General*

2924. CHAPPUIS, J.-B. La politique forestière de pays pauvres en forêts d'Europe occidentale. [**The forest policy of the western European countries poor in forests.**] *Schweiz. Z. Forstw.* 104 (1/2), 1953 (15–26). 7 refs. [F.g.]

Describes the forest resources and discusses the forest policy of Great Britain, Denmark and the Netherlands.

2925. COLLIER, F. S. **Forest adviser's note on a visit to Tanganyika, October-November, 1951.** Colonial Office, London. 1952. pp. 10.

A general report on forests and forestry with recommendations for future policy.

904. *General Regional Accounts of Forests and Forestry*

See also Nos. 2586, 2925.

2926. VENET, J. Forêts de hêtre et de chêne en Yougoslavie. [**Beech and Oak forests in Jugoslavia.**] *Rev. for. franç.* 1953 (2), (124–35). [F.]

Cf. *For. Abstr.* 14 (No. 2923).

2927. MIRHAYDARI. Aperçu sur les forêts de l'Iran. [**The forests of Persia.**] *Rev. for. franç.* 1953 (2), (113–8). [F.]

Includes a list of the principal species.

2928. BOUDY. Considérations sur la forêt algérienne et sur la forêt tunisienne. [**The forests of Algeria and Tunisia.**] *C.R. Acad. Agric. France* 39 (14), 1952 (529–48). [F.] A.P.B.

Mainly a general survey of the Algerian forest, including a description and notes on development, ownership, exploitation, fire, forest policy, regeneration, reforestation and silvicultural methods. A brief account of the Tunisian forest is also included.

2929. KING, N. L. **Some notes on forestry in Northern Rhodesia.** *J. S. Afr. For. Ass.* No. 22, 1952 (34–7 + 5 photos).

2930. DUPLAQUET, L. Quelques aspects forestiers des provinces méridionales de Madagascar. [**Some aspects of forestry in the southern provinces of Madagascar.**] *Rev. for. franç.* 1953 (2), (81–93 + 3 photos). [F.]

2931. MCADAM, J. B. **The forests of the territories of Papua and New Guinea.** *Aust. Timb. J.* 18 (8), 1952 (674 . . . 705).

Includes a list of some 20 of the more abundant and useful tree species, with particulars of their properties and uses.

905. *Forest Statistics and Resources*

2932. **Census of Woodlands 1947–1949. Woodlands of five acres and over.** *Census Rep. For. Comm., Lond.* No. 1, 1952. pp. 264 + 12 photos. Price 12*s.* 6*d.*

The present report includes all the data given in the earlier *Summary Report* [cf. *For. Abstr.* 13 (No. 850)] and reviews the Census findings at greater length and in greater detail. Information is presented for Great Britain as a whole, and for England, Scotland, and Wales individually. Part I deals with purpose and methods of the census survey, part II gives data on area, part III data on volume and increment, and part IV compares the results of this and earlier surveys and gives the main conclusions.

2933. Domänverket år 1951 av Kungl. Domänstyrelsen. [**Work in the State Forests, 1951, by the Royal State Forestry Board.**] *Sveriges Officiella Statistik: Skogshushållning.* Kungl. Boktryckeriet.

P. A. Norstedt & Söner, Stockholm. 1953. pp. viii + 131. [Sw.]

2934. Th[alassinos], D. Hē Kratikē ekmetalleusis dasōn apo tou 1945 mechri telous oik. etous 1950–1951. **[State exploitation of the Greek forests during the period 1945–51.]** *Dasos* No. 19, 1952 (35–8). [Gk.]

State forest working, started in 1937, was ended by the foreign occupation, when all installations such as sawmills were destroyed. After the liberation working was resumed, along with the introduction and revision of working plans, but the Civil War caused a set-back until autumn 1949. A general account of recent developments is given, along with a table showing the State forests being currently worked, their prescribed yields in timber and fuel (cu.m.), actual outturn and numbers of permanent staff. During 1945–51 the total output amounted to 230,000 cu.m. of timber and 10,000 cu.m. in fuel.

In 1945 serious fires destroyed ca. 270,000 cu.m. of standing timber and as salvage work was beyond the capacity of private agency, the State stepped in and extracted 147,000 cu.m. of timber in the following year.

2935. Giddings, E. L. **Timber resources [of New England].** *Industr. Engng. Chem.* 44 (11), 1952 (2527–9). P.R.

Part of a series 'Resources for the chemical industry in the United States'. Forests of New England, covering over 31,000,000 acres, belong to 4 types: Spruce/Fir, White Pine/hardwood, northern hardwoods, and Oak/Pine. Six tables give: (1) forest area, (2) timber volume at the beginning of 1945; (3) number of primary forest products plants in 1947; (4) number of pulp mills in 1951; (5) timber drain from commercial forest; and (6) drain vs. growth. The unused excess of wood waste is estimated at 25,000,000 cu. ft. annually.

2936. Larson, R. W. **The timber situation in Florida.** *For. Resour. Rep. U.S. For. Serv.* No. 6, 1952. pp. 60 + map. 28 refs.

2937. **Forest statistics of Indiana.** *For. Surv. Release Cent. St. For. Exp. Sta.* No. 15, 1953. pp. 36 + 1 map.

Cf. *For. Abstr.* 13 (No. 2672).

2938. **Forest resources of Montana.** *For. Resour. Rep. U.S. For. Serv.* No. 5, 1952. pp. 76 + map. 20 refs.

2939. Tuset, R. Panorama forestal del Uruguay. **[Forest survey of Uruguay.]** *Silvicultura, Uruguay* 1 (1), 1951 (13–28). 5 refs. [Span.e.]

Information about the forests, their composition and extent, national production, consumption and import of timber. The forest area is 2·21% of the whole land surface and more than 90% of the forests are privately owned. Annual timber consumption per head of population is small (224·4 kg.), but imports cost the country ca. 11½ million U.S. dollars yearly. The author recommends that a complete forest law should be drawn up and that private and public reforestation should be encouraged.

907. *Indirect Significance of Forests (Rural Amenity, National Parks, Forest Influences etc.)*

See Nos. 1901–5.

91. LAND USE, LAND-USE POLICY (INCLUDING AFFORESTATION POLICY)

See No. 2131.

92. FOREST OWNERSHIP AND OWNERSHIP POLICY

2940. Wardi. Siapa jang harus mengurus hutan? **[Who should manage the forest?]** *Rimba Indonesia* 1 (2), 1952 (51–68 + 1 map). 41 refs. [Jav.e.]

Gives figures for forest ownership in America, Europe and Asia, and in more detail for Indonesia, and concludes that in Indonesia the Forest Service should control the management of forests, but that the right of sale of forest land by individuals should remain. *From author's summary.*

2941. **Municipal forest management.** [? Ontario Department of Lands and Forests.] [1952?]. pp. 79 + 13 forms.

2942. Eggeling, M. D. **Municipal forest administration in Ontario.** *Emp. For. Rev.* 31 (4), 1952 (318–24 + 3 photos). 6 refs.

Describes the organization, discusses management in municipal forests and describes briefly some of the forests concerned.

93. PUBLIC SUPERVISION AND REGULATION OF FORESTRY, INCLUDING LEGISLATION FOR THESE PURPOSES

2943. Code forestier. **[The Forest Law.]** *Repr. from Journal Officiel de la République Française, Paris* No. 52–97*S*, 1952. pp. 49. [F.]

A codification of all the existing French laws and ordinances dealing with forests and forestry.

2944. Kossenakēs, G. Hē historikē exelixis tēs dasikēs nomothesias mas apo tou 1836 mechri tou 1926. **[Historical development of Greek forest legislation, 1836–1926.]** *Dasos* No. 19, 1952 (17–32). [Gk.]

The first regulations concerning forests were promulgated in 1830. They dealt with royalty rates on minor products such as resin and vallonia, besides imposing export and import duties. Early in King Otho's reign, a system of licences was introduced, without much success, on felling and fuel supply. In 1836 the first Forest Law came into force. This prohibited the felling and cultivation of forest land without proof of ownership, and the grazing of regeneration areas. It also provided for the classification and description of both coniferous and hardwood forests and despite much popular opposition was instrumental in saving from destruction most of the forests of the Peloponnesus and Sterea Hellas. In 1837 a committee was set up to make recommendations on the introduction of exotics but without practical result. After a preliminary failure in 1856, a supplementary Forest

Law regulating fires, grazing and breaking up of land in both private and state forests was passed in 1861 but the anarchy prevailing in the country prevented its implementation. A further Law of 1883, which recognized the claims of current occupiers of land to its ownership, lost the country large tracts of forest (which the new owners felled and destroyed). Between 1888 and 1926 a succession of enactments dealt with (*a*) delimitation of state forests, (*b*) forest service organization, (*c*) staff training, (*d*) establishment of forestry schools, (*e*) regulations of fellings and other forest operations in state and private forests, (*f*) royalty rates and forest taxation. The author comments that all this legislation has been ahead of public sentiment and has not prevented the forest area of the country from dwindling to 10% of the whole.

2945. **Laws of the Gold Coast 1951. Chapter 122. Forests.** Government Printing Department, Accra, and Crown Agents for the Colonies, London. 1951. pp. 26. Price 3*s.* 6*d.*

2946. **Bill—The Forestry Act, 1952.** The Queen's Printer, Toronto. 1952. pp. 3.

The text of an Act passed by the Ontario legislature, amending and consolidating previous legislation.

2947. Annuaire International de Législation Agricole: XXXIII^{ème}-XXXV^{ème} années 1943–1945. **[International Yearbook of Agricultural Legislation: 33rd-35th years, 1943–1945.]** FAO, Rome. 1952. pp. 974. [F.]

This volume fills a gap in the series of yearbooks covering the years 1911–46 inclusive. Starting in 1952 the place of the yearbooks will be taken by a quarterly review of agricultural legislation published in English, French and Spanish.

2948. Numero speciale dedicato alla nuova legge per la montagna numero 991 del 25 luglio 1952. **[Special number devoted to the new [Italian] law for [soil and water conservation in] the mountains, No. 991 of 25 July, 1952.]** *Monti e Boschi* 3 (11/12), 1952. [It.]

2949. **[Special number devoted to the new Italian law for soil and water conservation in mountain areas.]** *Ital. for. mont.* 7 (6), 1952 (283–349). [It.f.]

Includes the text of the law.

2950. Gorrie, R. M. **The Ceylon Soil Conservation Act.** *Emp. For. Rev.* 31 (4), 1952 (315–7 + 6 photos).

Discusses briefly the rules that can be framed under the Act, to prevent erosion.

94. OTHER METHODS TO IMPLEMENT FOREST POLICY

See also No. 2304.

943. *Forest Insurance*

2951. Martín Gáto, T. Seguro y crédito. Medios indispensables para una eficaz política forestal. **[Insurance and credit. Indispensable measures for an effective forest policy.]** II Congreso Nacional de Ingeniería, Instituto de Ingenieros Civiles de España, Madrid 1950, Vol. IV, 1951 (565–615). [Span.]

Presents data on forest fires in Spain, and discusses at some length possibilities and problems of instituting a system of forest insurance. The author concludes that such a system would be feasible so long as it had adequate capital backing and the property insured was of substantial value and suitably distributed.

945.3. *Education. Training*

See also No. 1868.

2952. Moron, I. La Escuela Industrial de Silvicultura. **[The School of Forestry.]** *Silvicultura, Uruguay* 1 (1), 1951 (5–12). [Span.span.e.]

History and organization of the forestry school centred at Maldonado, Uruguay, which is part of the Technical University (Universidad de Trabajos) and conducts a certain amount of research.

945.4. *Research*

See also Nos. 1876, 2096, 2274, 2580–1, 2952.

2953. Stand und Ergebnisse der forstlichen Forschung seit 1945. **[Present position in and results of forest research [in Germany] since 1945.]** *Schriftenreihe des AID* (*Land- und Hauswirtschaftlicher Auswertungs- und Informationsdienst*), *Bad Godesberg* No. 37, 1952. pp. [2] + 157. Numerous refs. [G.]

A series of brief reviews, by experts, of German research literature for the period on the following subjects, each review carrying its own extensive bibliography: Forest botany, incl. genetics, mycology, wood and bark anatomy, and tree physiology (*B. Huber*, pp. 1–14). Soil science (*R. Themlitz*, pp. 15–27.) Entomology and zoology (*E. Merker*, pp. 28–50.) Increment and yield studies (*J. Weck*, pp. 51–60). Foundations of silviculture, and Silvicultural technique (both by *J. N. Köstler*, pp. 61–9 and 70–8.) Mechanical, technological and chemical research on wood (*H. von Pechmann*, pp. 79–91.) Biological research on wood (*H. Mayer-Wegelin*, pp. 92–9.) Work studies (*H. H. Hilf*, pp. 100–20.) Forest management and economics (*Engstler*, pp. 121–31.) Forest policy (*J. Speer*, pp. 132–43.) Forest history and Forest law (both by *K. Mantel*, pp. 144–53 and 154–7.)

2954. Statens Skogsforskningsinstitut 1902–1952. **[The State Forest Research Institute 1902–52.]** *Medd. SkogsforsknInst., Stockh.* 42 (1), 1952. pp. 307. Many refs. [Sw.]

A publication to mark the 50th anniversary of the Institute's foundation. The chapters on the different sections include accounts of the most important results and investigations, and lists of material published during the period.

2955. Statens Skogsforskningsinstituts publikationer 1902–1952. **[Publications of the State Forest Research Institute 1902–52.]** Statens Skogsforskningsinstitut, Stockholm. 1952. pp. [106]. [Sw.]

95. FOREST TAXATION

2956. Simeunović, D. Istraživanje i utvrđivanje čistog prihoda od zemljišta s obzirom na šume i

šumsko zemljište (po Zakonu o neposrednim porezima od 1928 g.). **[Investigation and fixation of the net financial yield of forests and forest lands (according to the 1928 law on direct land taxation).]** *Glasn. šum. Fak., Beograd* No. 3, 1951 (59–128). 72 refs. [Serb.f.]

A criticism of the 1928 law, which unified the system of direct land taxation on the basis of the net financial yield, neglected considerations of actual productivity and applied arbitrary surcharges to assessments. A sound system would require complete reclassification and revaluation of the land.

96. FOREST LABOUR QUESTIONS, LABOUR QUESTIONS IN WOOD TRANSPORT AND THE WOOD INDUSTRIES

See also Nos. 2297–2300.

2957. CONDON, L. **Practical economics of forest operations with particular reference to operations on a piece-work basis.** *Irish For.* 9 (2), 1952 (53–66).

Discusses in some detail the application of piece rates to nursery and plantation work and recommends their adoption in Ireland.

2958. EDLIN, H. L. **Britain's new forest villages.** *Unasylva* 6 (4), 1952 (150–9).

2959. LUDVIGSEN, F. P. Arbeidsbehovet i våre gårdsskoger. **[Labour requirements in Norwegian farm woodlands.]** *Tidsskr. Skogbr.* 60 (12), 1952 (279–88). [Nor.]

Gives figures showing the estimated time in days p.a. for the different operations of extraction, regeneration, tending of stands, drainage and road work, for woodlands of different area in different parts of Norway.

97. INTERNATIONAL FOREST POLICY AND OTHER INTERNATIONAL COLLABORATION

971. *Congresses. Conferences*

See No. 2582.

References: 1. *ASTM Bulletin*, Easton, Pa.; 2. *Bi-monthly Progress Report, Division of Forest Biology*, Ottawa; 3. *Bolivia Maderera*, La Paz; 4. *British Columbia Lumberman*, Vancouver; 5. *FAO Plant Protection Bulletin*, Rome; 6. *India News*, London; 7. *Journal of Forestry*, Washington; 8. *Lumberman*, Seattle; 9. *New Commonwealth*, London; 10. *News Bulletin of the International Association of Wood Anatomists*, Melbourne; 11. *Nigeria Trade Journal*, Lagos; 12. *Paper Trade Journal*, New York; 13. *Quarterly Journal of Forestry*, London; 14. *Report of the Department of Lands and Forests, Alberta*, Edmonton; 15. *Skogen*, Stockholm; 16. *Stalinsko Zname*, Varna; 17. *Tidsskrift for Skogbruk*, Oslo; 18. *Timber Trades Journal*, London; 19. *Times*, London; 20. *Vecherni Novini*, Sofia; 21. *Wood*, London.

International.

The fifth International Plant Protection Conference organized by the Eastern European countries was held in Berlin, 2–14 Dec. 1952. It was attended by representatives of Albania, Bulgaria, Czechoslovakia, Eastern Germany, Hungary, Poland, Rumania and the U.S.S.R. It was devoted to the problems of plant quarantine for the prevention of the spread of plant diseases and pests across the frontiers of the participating countries. Agreements between the participating governments are to provide for the application of modern methods of research and of pest control, making use of published knowledge throughout the world, without restrictions (**5**; Feb. 1953).

The Central International Forest Insect and Disease Conference held its first meeting at St. Paul, Minnesota in Jan. 1953. The purpose of the conference is to provide a meeting ground for discussion of the technical aspects of forest pathology and entomology in the general region that includes Saskatchewan, Manitoba, Ontario, Minnesota, Wisconsin and Michigan. An important feature of this new organization is its restricted regional application, which is intended to facilitate attendance by a large proportion of interested individuals (**2**; Jan.–Feb. 1953).

A congress organized by the Deutsche Gesellschaft für Holzforschung will be held in Constance, 9–11 June 1953. Questions concerning the sawmill industry, utilization of timber waste, and surface treatment will be discussed and a number of sawmills will be visited (**18**; 11.4.53).

A European conference on forest productivity and timber economics is to be held in Stuttgart, 7–12 Sept. 1953, under the auspices of O.E.E.C. and the Mutual Security Agency. The proceedings will be published as an O.E.E.C. report (**15**; 15.5.53).

The Eighth International Congress of Botany will be held in Paris in July, 1954. Wood anatomy will form part of a special sub-section attached to the section of Forest Botany, and subjects for discussion include: cases of similarity of wood arrangement in adult timbers of different genera and especially of different families of angiosperms; relations between transverse shrinkage and wood structure; and the origin of tension wood and its influence on the properties of the wood (**10**; April 1953).

Bolivia. A plan, based on studies by H. de Irmay and H. E. Holman, for the exploitation of the Bolivian forests (including the establishment and redistribution of sawmills and plants for the conversion and preservation of timber) is already being put into practice by the Agricultural Department of the Bolivian Development Corporation. A circular sawmill has been established in the Espejo region, and a band sawmill is being set up in the Todos Santos region (**3**; Jan. 1953).

Bulgaria. Shelterbelts covering nearly 74,000 dekares had been planted in the Dobrudzha up to the end of 1952. It was intended to plant another 23,000 dekares in the spring of 1953 (**16**; 24.3.53).

Eucalypts planted in 1949 are doing well; they are now 9·5 m. high and 22 cm. in diameter (**20**; 21.3.53).

Canada. A new laboratory of forest pathology has been established at Calgary to study forest diseases in Alberta, the Northwest Territories and the National Parks in British Columbia and Alberta. Investigations will include studies of decay in Spruce; the development of a forest disease survey; red stain in fire-injured Pine stands; rate of decomposition of Pine slash under different degrees of cutting; dwarf mistletoe on Pine; and fundamental physiological and biological studies of destructive tree parasites (**14**; 1952).

New Westminster members of the British Columbia Manufacturers Association are supplying the Coronation Committee of the City of Westminster with 45-ft.-long, 10 × 10-in. Douglas Fir timber for the maypole to be erected in the Strand (**4**; Feb. 1953).

Gold Coast. A consignment of 62 prefabricated wooden houses has been ordered from Sweden by the Government. They are to be assembled at Accra, and if they prove successful, experiments will be made in manufacturing similar houses from local timbers (**9**; 2.2.53).

Great Britain. In the course of a debate in the House of Commons on home-grown-timber policy, the Minister of Agriculture stated that, in conjunction with the Secretary of State for Scotland, he was setting up a committee to advise the Forestry Commissioners on the problems of hedgerow and farm timber. The terms of reference of the committee are: 'In view of the national need to promote timber production, to examine the extent to which the growth of hedgerow timber is compatible with good agricultural practice; and to make recommendations as to the best means of securing the planting and tending of hedgerow timber'. Shelterbelts are not included within the terms of reference, but it is understood that 'hedgerow timber' will cover all roadside trees, even those not actually in a hedge, and also small spinneys (**13**; April 1953).

The Forestry Commission, with the co-operation of private landowners and the Ministry of Agriculture, are introducing the payment of one shilling for the tail of every grey squirrel killed. The scheme will operate for two years. *Sciurus carolinensis* was first released in Britain about 60 years ago, and multiplied prodigiously. The 400 grey squirrels believed to have been released between 1890 and 1930 in the Home Counties, Devon, Cheshire, Yorkshire, and Denbighshire, have now populated most of the woodlands of England and Wales and a narrow tract of central Scotland. More than 168,000 were killed last year. If numbers continue to increase, it will become impossible to grow commercial crops of Beech, Sycamore and Oak. The animal also attacks Birch and Ash and has shown a liking for Larch (**19**; 11.3.53).

The use of hardwoods from British Guiana in timber groynes, which are the first line of defence against coast erosion in many parts of the British Isles, is being tested at Shoreham by the T.D.A. in co-operation with the Shoreham and Lancing Sea Defence Commissioners. On a stretch that is particularly vulnerable to heavy shingle drift, a 250-ft. groyne has been constructed from Greenheart (*Ocotea rodiaei*), Wallaba (*Eperua* spp.) and Mora (*Mora excelsa*). Although the initial cost of building such groynes is about double that of softwood groynes, their longer life may make them more economical. Local authorities generally prefer the traditional timber groynes to steel or concrete, mainly because of their greater resilience (**19**; 11.4.53).

Two technical experts, one from the Forest Products Research Laboratory, Princes Risborough, are to examine the possibilities of exterminating death-watch beetle in the timber of H.M.S. *Victory*, Nelson's flagship at Trafalgar, by radiological treatment. It is believed that deep penetration of the timbers with X-rays would not only kill the beetles but would make their eggs sterile. The method, if successful, might be used to preserve old timbers in cathedrals and other buildings (**18**; 4.4.53).

The 'Sabre', a new scrub-clearing and general-purpose slashing machine for use with a tractor, is being manufactured by J. Foster & Co. Ltd., North Cave, Brough, Yorkshire. The machine can be fitted with either a 4-cutter slashing blade for such work as hedge trimming or cutting undergrowth or a 100-tooth saw-blade for logging operations. The saw-blade will cut logs of 18–20 in. diam., and the slashing blade growth up to 4 in. diam. The blade is fixed to a tubular jib fitted to the front of the tractor and can be adjusted to 8 positions between horizontal and vertical (**21**; May 1953).

A comprehensive set of timber extraction equipment for the 'Challenger 3' diesel crawler tractor has been made available by the manufacturers, John Fowler and Co. (Leeds), Ltd., Leeds 10. All or part of this equipment can be fitted. It consists of a direct-geared, single-speed, reversible logging winch, a canopy to protect driver and controls against falling timber or extreme tropical weather, a front bumper bar to take the strain when the tractor is used for pushing, and guards to protect top rollers and support the brackets and hull plate (**18**; 9.5.53).

A new moisture meter, the Dawe type 2100, has been developed by Dawe Instruments Ltd., 83 Piccadilly, London, W.1. It is a compact battery-operated instrument, comprising a direct-reading megohm-meter calibrated in % moisture for wood, together with a dual-purpose electrode. The range covered is from 7 to 40% moisture content (**20**; April 1953).

A new wind tunnel of pressed and moulded plywood has just been completed at the Cranfield Aeronautical College. The laminated wooden packings are of Mahogany and continental Birch, and the 11-ply panels of Beech and Mahogany. Plywood was found easier to work and to handle, and more readily capable of adjustment, and gives a truer, smoother surface than the sheet steel normally used (**18**; 6.6.53).

The whole lower part of the State Coach, consisting of 8 panels painted by Cipriani in 1761, was found to be splitting and breaking up. The wood has been removed and the paint film has been transferred to panels of the resin-impregnated plywood, Permaply, manufactured by Venesta Ltd. (**20**; May 1953).

Greenland. It is announced in Copenhagen that Professor C. A. Jørgensen, of the Danish Agricultural Research Institute, intends to plant 15,000 trees at Julianehåp on the west coast of S. Greenland. Sitka Spruce from Alaska and some other species from Labrador and Finnish Lapland are to be tried (**17**; April 1953).

India. Research is being conducted at the Forest Research Institute, Dehra Dun, on the preparation of chlorophyll concentrates and products from leaves of both forest and agricultural origin. A process has been developed for the preparation of soluble Cu chlorophyll extract from a plant of known insecticidal properties (**6**; 25.4.53).

Nigeria. Experiments have been carried out in the United Kingdom on the use of the oil extracted from the Conophor Nut [*Tetracarpidium conophorum*] in making varnish and paint. The nut grows on a vine in the forests of Nigeria and commands a high price as a delicacy. The oil compares well with linseed oil, to which it is superior for certain purposes. The Nigerian Department of Agriculture is studying the problems of growing and harvesting, and the Department of Commerce and Industries is investigating the processing of the nuts and the extraction of the oil (**11**; April 1953).

Norway. Measures taken to control the spread of *Myelophilus piniperda* in badly affected districts include an order by the Department of Agriculture forbidding the storage of unbarked Pine timber or waste wood other than twigs and branches in the forest, in timber yards, or on farms, between 1 April and 15 September; enforcing the barking of all Pine stumps immediately after felling; and empowering local forest officers to instruct landowners to fell trees or bark timber where this seems necessary to prevent the attack from spreading (**17**; Feb. 1953).

U.S.A. A report made to the American Association of Economic Entomologists in December 1952, states that prediction of Saratoga spittlebug outbreaks in the Lake States may be made from measurement of tree growth of Red Pine. Light infestations of the spittlebug cause little or no apparent damage to the tree, but do cause changes in tree form, as expressed by the ratio of height growth to branch growth for each year. If these changes are observed early enough the insects may be controlled before they build up into a heavy infestation fatal to the trees (**7**; April 1953).

Peliaspis pini Mask., a scale insect, was collected on *Pinus* sp. in Baltimore, Maryland, in Oct. 1952. This is the first record in the United States. It has been recorded on several conifer species in Japan and China (**5**; Feb. 1953).

A comprehensive research programme was officially launched by the American Society for Testing Materials in March 1953. A nation-wide organization, based on regional committees, will enlist the co-operation of pole producers, treaters, and users in underwriting the cost of this programme, which is estimated at $150,000, covering a 2-year period. The principal objects are: to obtain reliable data on the strength of full-size poles; to determine the effect on the strength of poles of knots, spiral grain, checks, and splits; to establish a relationship between tests of small clear specimens and tests of full-size poles; and to determine the effect of accepted processes of preservative treatment on the strength of poles (**1**; April 1953).

'Resinwood' is a new industrial board made by Resinwood Products, Rock Island, Ill., from granulated wood fibre bonded with phenolic resins under extreme heat and pressure. Both sides of the finished board have a smooth natural Pine-coloured surface and although no further decoration is necessary, the board can be treated with various finishes (**8**; 25.3.53).

A lumber company in New York State is using waterproofed paper, to protect converted building timber during outdoor storage. The timbers are sorted into uniform bundles, secured with steel straps, and then wrapped in the waterproofed paper, which is secured with thin wooden strips (**12**; 10.10.52).

The new shipping container, the 'Ply-veneer', is being manufactured by the Weyerhaeuser Timber Company, Springfield, Ore., from kraft paperboard, Douglas Fir veneer and wooden cleats. It has the stiffness and resistance to crushing of wood, and the toughness, impact resistance, strength, light weight and smoothness of fibre containers. It can be shipped flat. It is moisture- and water-resistant and can be used as a cold-storage container, as well as for shipping fresh fruit, ammunition and explosives, meat and meat products, small metal parts, cheese, butter and various air cargoes (**8**; April 1953).